United States
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Natural
Resources
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Service

In cooperation with
Iowa Agriculture and Home
Economics Experiment
Station and Cooperative
Extension Service, Iowa
State University, and
Division of Soil
Conservation, Iowa
Department of Agriculture
and Land Stewardship

Soil Survey of Keokuk County, Iowa

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How To Use This Soil Survey

General Soil Map

The general soil map, which is a color map, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

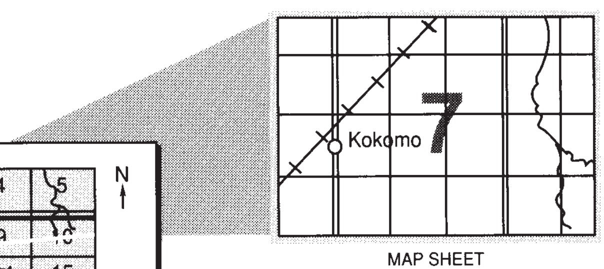
Detailed Soil Maps

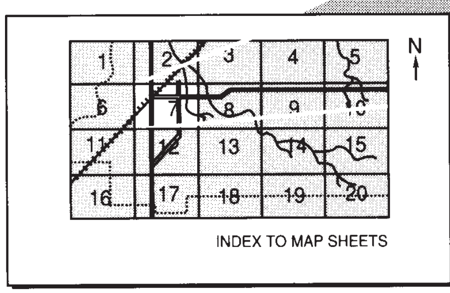
The detailed soil maps can be useful in planning the use and management of small areas.

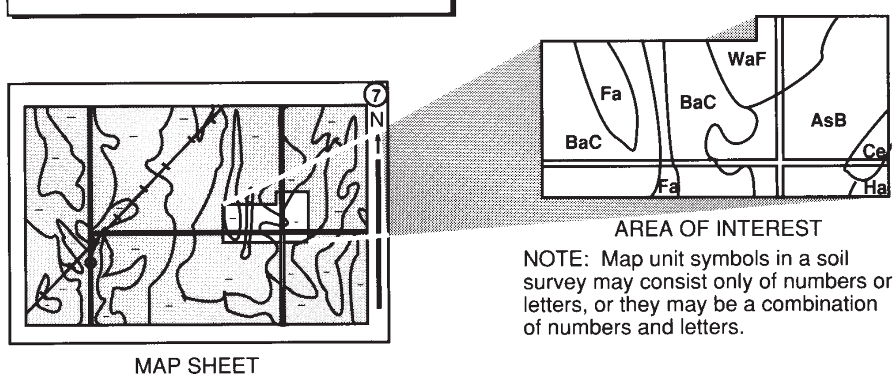
To find information about your area of interest, locate that area on the **Index to Map Sheets**. Note the number of the map sheet and turn to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.







NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1997. Soil names and descriptions were approved in 1999. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1997. This survey was made cooperatively by the Natural Resources Conservation Service; the Iowa Agriculture and Home Economics Experiment Station and the Cooperative Extension Service, Iowa State University; and the Division of Soil Conservation, Iowa Department of Agriculture and Land Stewardship. Financial assistance was provided by the Keokuk County Board of Supervisors. The survey is part of the technical assistance furnished to the Keokuk County Soil and Water Conservation District.

Cover: A pond in the Hayesville Bend Water Management Area. The pond was constructed by the Iowa Department of Natural Resources for grade stabilization. It also supplies water for wildlife and provides a habitat for fish. The soils near the pond are dominantly Clinton, Keswick, and Lindley soils.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service homepage on the World Wide Web. The address is http://www.nrcs.usda.gov.

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Issued 2003

Where To Get Updated Information

The soil properties and interpretations included in this survey were current as of 1999. More current information may be available from the Natural Resources Conservation Service (NRCS) Field Office Technical Guide at Sigourney, Iowa, or online at www.nrcs.usda.gov/technical/efotg. The data in the Field Office Technical Guide are updated periodically.

More current information may also be available through the NRCS Soil Data Mart Website at http://soildatamart.nrcs.usda.gov/

Additional information about soils and about NRCS is available through the Iowa NRCS Web page at www.ia.nrcs.usda.gov.

For further information, please contact:

USDA, Natural Resources Conservation Service
Iowa State Office
210 Walnut Street, Suite 693
Des Moines, IA 50309-2180
Phone: 515-284-4353

Foreword

This soil survey contains information that affects land use planning in this survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described, and information on specific uses is given. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Leroy Brown, Jr.
State Conservationist
Natural Resources Conservation Service

Soil Survey of Keokuk County, Iowa

By John A. Lucassen, Natural Resources Conservation Service

Fieldwork by Robert O. Dideriksen, Stephen J. Ernst, and John A. Lucassen, Natural Resources Conservation Service

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
the Iowa Agriculture and Home Economics Experiment Station and the Cooperative Extension Service, Iowa State University, and the Division of Soil Conservation, Iowa Department of Agriculture and Land Stewardship

Keokuk County is in southeastern Iowa (fig. 1). It has an area of 371,300 acres, or about 580 square miles. Sigourney is the county seat. It is in the central part of the county, about 75 miles southeast of Des Moines.

This soil survey updates the survey of Keokuk County published in 1971 (Jones and Highland, 1971). It provides additional information and has larger maps, which show the soils in greater detail.

Figure 1.—Location of Keokuk County in Iowa.

General Nature of the Survey Area

This section provides some general information about Keokuk County. It describes history and development, transportation facilities, drainage, relief, agriculture, and climate.

History and Development

The survey area was acquired by the United States from France as a part of the Louisiana Purchase in 1803. In 1804, the area became part of the District of Louisiana, which, for administrative purposes, was attached to the Territory of Indiana. In 1805, the area became part of the Territory of Louisiana. When the State of Louisiana was admitted into the Union in 1812, the area became part of the Territory of Missouri. When Missouri was admitted into the Union in 1821, the area that is now Keokuk County was part of a territory that received no attention and was left without any form of government for 13 years. The area was considered part of the unorganized territory of the United States until 1834. In September 1834, the area became part of the Michigan Territory. It was part of Des Moines County, Michigan. In April 1836, the area became part of the Wisconsin Territory (Western Historical Company, 1879). Keokuk County was organized in 1844 (Tuttle, 1876).

At the time of the purchase from France, the survey area was inhabited by several tribes of Native Americans. The first settlement by people of European descent was Richland, which was established in 1838. Numerous other European settlements in the area in 1843 were precipitated by the Fox Cession of 1842. In

1843, a sawmill was built near the confluence of the South Skunk River and the North Skunk River.

Sigourney was made the county seat, and substantial county buildings were erected. A new courthouse was erected in 1859; this building is still in use today.

On October 25, 1943, the Keokuk County Soil Conservation District was formed. The first elected commissioners were Glen Sorden, Solon T. Yates, and Carl Greiner.

Transportation Facilities

Two major highways serve Keokuk County. State Highway 92 crosses the county dominantly from east to west, and State Highway 149 crosses from north to south. These highways intersect at Sigourney. Other highways include State Highways 21, 78, and 22. Hard-surface county roads connect these highways to all of the smaller communities in the county. All farms and rural residences have access to either these roads or roads of gravel or crushed limestone. Major county roads are well distributed throughout the county.

One railroad freight line passes through the southeast corner of Keokuk County near Richland. An airport is available near Sigourney. Motor freight lines service every trading center in the county.

Drainage

The Skunk River and its tributaries drain about 80 percent of Keokuk County (fig. 2). The South English River and its tributaries drain the northern part of the county, or about 20 percent.

Coal Creek, Cedar Creek, Bridge Creek, Rock Creek, Crooked Creek, and German Creek flow south into the Skunk River. These tributaries drain about 45 percent of the county.

Sugar Creek, Waugh Creek, Gobbler Creek, Steady Run Creek, South Rock Creek, and Richland Creek flow northward into the Skunk River. They drain about 35 percent of the county.

Relief

The highest point of elevation in Keokuk County is approximately 910 feet above sea level. It is near Thornburg in the northwest corner of the county. The lowest point of elevation, approximately 625 feet above sea level, is at the point where the Skunk River leaves the county, approximately 3 miles northeast of Richland.

The difference in elevation between the lowlands and adjoining uplands in the county ranges mainly from 100 to 120 feet along the Skunk River and its tributaries. The difference in elevation between the lowlands and adjoining uplands ranges from 80 to 100 feet along the South English River and its tributaries in the northern part of the county.

The relief along the Skunk River and its tributaries is characterized by moderately steep slopes rising from the lowlands. The relief near the remaining, smaller drainage systems is characterized by moderately sloping and strongly sloping areas rising from the lowlands.

Agriculture

Agriculture is the main economic enterprise in Keokuk County. It provides a livelihood for farmers and for those engaged in business, finance, and many other related agribusiness activities. Most of the local income is from the sale of livestock and grain.

The most extensively raised livestock in Keokuk County are beef cattle, hogs, and sheep. In 1993, 14,300 head of grain-fed cattle, 361,000 head of market hogs, and 7,900 head of grain-fed lambs were marketed (Skow, 1994).

In 1994, crop production in the county consisted of 115,900 acres of corn, 69,800 acres of soybeans, 4,500 acres of oats, 18,300 acres of hay, and 1,300 acres of wheat (Sands, 1997). The production from these crops is used in livestock rations or sold on the cash grain market.

The number of farms in Keokuk County has been declining, but the average farm size is increasing. In 1994, there were 1,040 farms consisting of 351,800 acres. The average farm size was 338 acres (Sands, 1997).

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Sigourney in the period 1961 to 1990. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 24.4 degrees F and the average daily minimum temperature is 15.2 degrees. The lowest temperature on record, which occurred on February 4, 1996, is -27 degrees. In summer, the average temperature is 73.9 degrees and the average daily maximum temperature is 84.8 degrees. The highest recorded temperature, which occurred on August 15, 1988, is 107 degrees.

Figure 2.—The Skunk River and its tributaries drain most of Keokuk County. Areas of Nodaway silt loam, channeled, 0 to 2 percent slopes, frequently flooded, are adjacent to the river.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 34.11 inches. Of this total, 23.49 inches, or about 69 percent, usually falls in April through September. The growing season for most crops falls within this period. The heaviest 1-day rainfall during the period of record was 4.75 inches on August 30, 1965. Thunderstorms occur on about 49 days each year, and most occur in June.

The average seasonal snowfall is 23.9 inches. The greatest snow depth at any one time during the period of record was 28 inches. On the average, 26 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year. The heaviest 1-day snowfall on record was 10 inches recorded on January 28, 1949.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 79 percent. The sun shines 70 percent of the time possible in summer and 51 percent in winter. The prevailing wind is from the northwest. Average windspeed is highest, 12.9 miles per hour, in April.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their properties and the subsequent effects on suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind or segment of the landscape. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landscape, soil scientists develop a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientists to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Individual soils on the landscape commonly merge into one another as their characteristics gradually change. To construct an accurate map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, soil reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Interpretations are modified as necessary to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a seasonal high water table within certain depths in most years, but they cannot predict that the water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields,

roads, and rivers, all of which help in locating boundaries accurately.

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

General Soil Map Units

The general soil map in this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. These broad areas are called associations. Each association on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The components of one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

1. Taintor-Mahaska Association

Nearly level and gently sloping, poorly drained and somewhat poorly drained, silty soils that formed in loess; on uplands

Setting

Landform and position on the landform: Broad and moderately broad flats and convex ridgetops on uplands (fig. 3)
Slope range: 0 to 5 percent

Composition

Extent of the association in the survey area: 11.5 percent
Extent of the components in the association:
Taintor soils—50 percent
Mahaska soils—42 percent
Soils of minor extent—8 percent

Soil Properties and Qualities

Taintor

Drainage class: Poorly drained
Parent material: Loess
Texture of the surface layer: Silty clay loam

Mahaska

Drainage class: Somewhat poorly drained
Parent material: Loess
Texture of the surface layer: Silty clay loam

Soils of Minor Extent

- The very poorly drained Sperry soils, which formed in loess; in depressions on broad upland flats
- The moderately well drained Nira soils, which formed in loess; on head slopes and side slopes on uplands

Use and Management

Major use: Cropland
Major management considerations: Taintor—wetness, maintaining fertility; Mahaska—maintaining fertility

2. Otley-Mahaska-Nira Association

Nearly level to moderately sloping, moderately well drained and somewhat poorly drained, silty soils that formed in loess; on uplands

Setting

Landform and position on the landform: Moderately broad flats, convex ridgetops, side slopes, and concave heads of drainageways on uplands (fig. 4)
Slope range: 0 to 14 percent

Composition

Extent of the association in the survey area: 15 percent

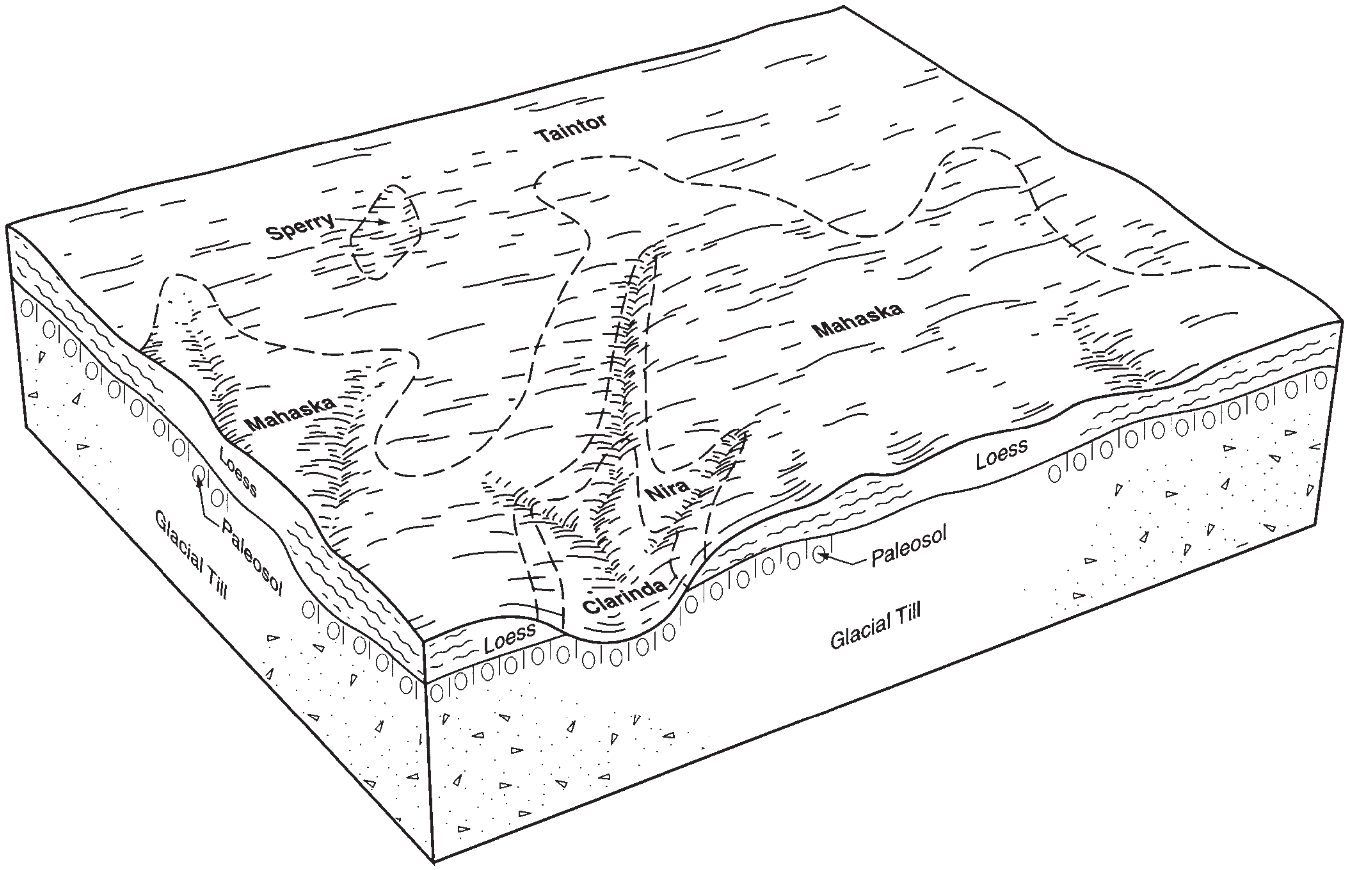

Figure 3.—Typical pattern of soils and parent material in the Taintor-Mahaska association.

Extent of the components in the association:
Otley soils—45 percent
Mahaska soils—23 percent
Nira soils—17 percent
Soils of minor extent—15 percent

Soil Properties and Qualities

Otley

Drainage class: Moderately well drained
Parent material: Loess
Texture of the surface layer: Silty clay loam

Mahaska

Drainage class: Somewhat poorly drained
Parent material: Loess
Texture of the surface layer: Silty clay loam

Nira

Drainage class: Moderately well drained
Parent material: Loess
Texture of the surface layer: Silty clay loam

Soils of Minor Extent

- The moderately well drained Olmitz soils, which formed in loamy colluvium; on alluvial fans in the uplands
- The poorly drained Clarinda and somewhat poorly drained Lamoni soils, which formed in a thin mantle of loess or pedisediment and the underlying gray paleosol weathered from till; on head slopes, nose slopes, and side slopes in the uplands
- The well drained Shelby soils, which formed in till; on nose slopes and side slopes in the uplands

Use and Management

Major uses: Cropland and pasture
Major management considerations affecting cropland: Otley and Nira—water erosion, maintaining fertility; Mahaska—maintaining fertility
Major management considerations affecting pasture: Forage quality

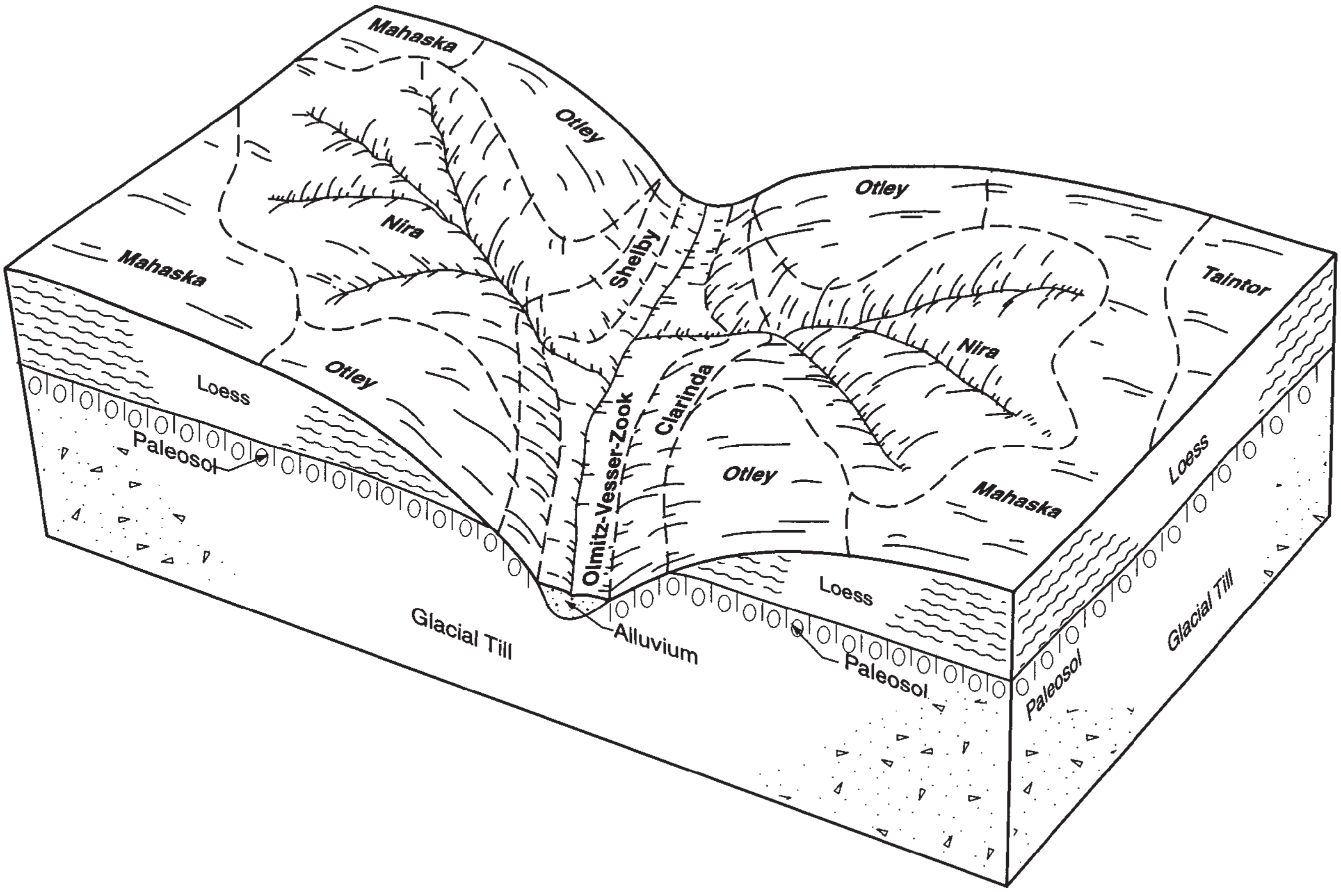

Figure 4.—Typical pattern of soils and parent material in the Otley-Mahaska-Nira association.

3. Ladoga-Gara-Hedrick Association

Gently sloping to steep, moderately well drained and well drained, silty or loamy soils that formed in loess and till; on uplands

Setting

Landform and position on the landform: Convex ridgetops, concave heads of drainageways, and side slopes on uplands (fig. 5)
Slope range: 2 to 25 percent

Composition

Extent of the association in the survey area: 36.5 percent (fig. 6)
Extent of the components in the association:
Ladoga soils—41 percent
Gara soils—12 percent
Hedrick soils—9 percent
Soils of minor extent—38 percent

Soil Properties and Qualities

Ladoga

Drainage class: Moderately well drained
Parent material: Loess
Texture of the surface layer: Silt loam

Gara

Drainage class: Well drained
Parent material: Till
Texture of the surface layer: Clay loam

Hedrick

Drainage class: Moderately well drained
Parent material: Deoxidized loess and the underlying gray paleosol weathered from till
Texture of the surface layer: Silty clay loam

Soils of Minor Extent

- The moderately well drained Olmitz soils, which

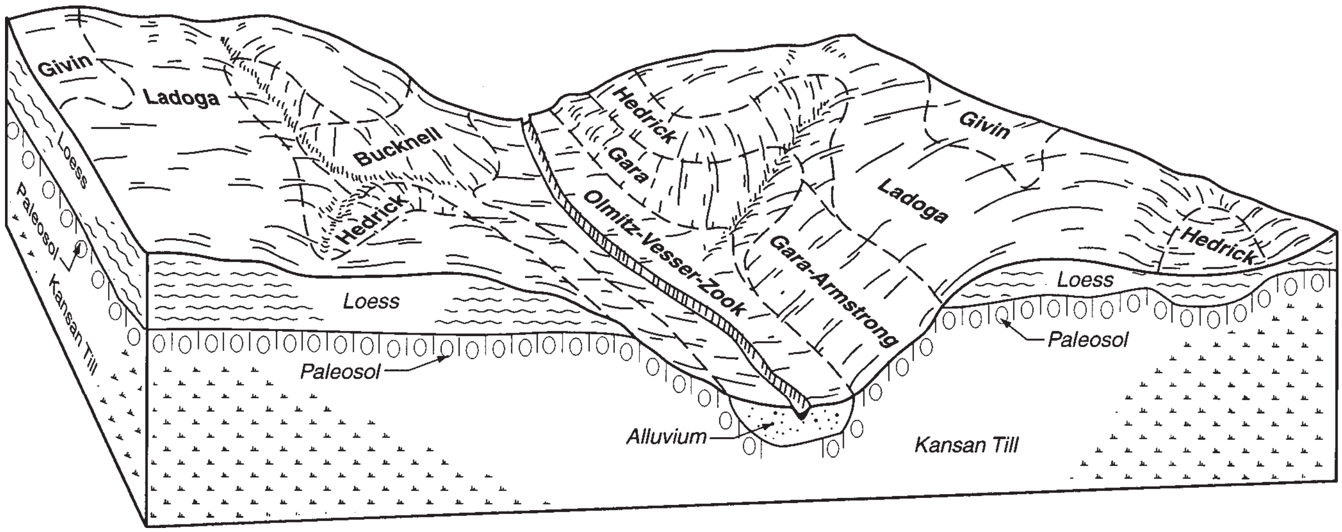

Figure 5.—Typical pattern of soils and parent material in the Ladoga-Gara-Hedrick association.

formed in loamy colluvium; on alluvial fans in the uplands

- The somewhat poorly drained Bucknell soils, which formed in a thin mantle of loess or pedisediment and the underlying gray paleosol weathered from till; on head slopes, nose slopes, and side slopes in the uplands
- The somewhat poorly drained Armstrong soils, which formed in a thin mantle of loess or pedisediment and the underlying reddish paleosol weathered from till; on nose slopes and side slopes in the uplands
- The somewhat poorly drained Givin soils, which formed in loess; on narrow to moderately broad flats and convex ridgetops in the uplands

Use and Management

Major uses: Cropland, pasture, and forestland
Major management considerations: Cropland—water erosion, maintaining fertility; pasture—forage quality; forestland—erosion hazard, equipment limitations, and plant competition

4. Clinton-Lindley-Keswick Association

Gently sloping to very steep, well drained, moderately well drained, and somewhat poorly drained, silty and loamy soils that formed in loess, in till, and in a thin mantle of loess or pedisediment and the underlying reddish paleosol weathered from till; on uplands

Setting

Landform and position on the landform: Convex ridgetops, interfluves, nose slopes, and side slopes in the uplands (fig. 7)
Slope range: 2 to 40 percent

Composition

Extent of the association in the survey area: 25 percent
Extent of the components in the association:
Clinton soils—40 percent
Lindley soils—20 percent
Keswick soils—10 percent
Soils of minor extent—30 percent

Soil Properties and Qualities

Clinton

Drainage class: Moderately well drained
Parent material: Loess
Texture of the surface layer: Silt loam

Lindley

Drainage class: Well drained
Parent material: Till
Texture of the surface layer: Loam

Keswick

Drainage class: Somewhat poorly drained

Figure 6.—The Ladoga-Gara-Hedrick association is the most extensive in Keokuk County. Ladoga and Hedrick soils, which formed in loess, are in the foreground.

Parent material: Thin mantle of loess or pedisediment and the underlying reddish paleosol weathered from till

Texture of the surface layer: Loam

Soils of Minor Extent

- The well drained Fayette soils, which formed in loess; on side slopes and nose slopes in the uplands
- The moderately well drained Inton soils, which formed in deoxidized loess and the underlying gray paleosol weathered from till; on head slopes and side slopes in the uplands
- The poorly drained Ashgrove soils, which formed in a thin mantle of loess or pedisediment and the underlying gray paleosol weathered from till; on head slopes, nose slopes, and side slopes in the uplands
- The moderately well drained Nodaway soils, which formed in silty alluvium; in narrow areas on bottom land

Use and Management

Major uses: Cropland, pasture (fig. 8), and forestland

Major management considerations: Cropland—water erosion, maintaining fertility; pasture—forage quality; forestland—erosion hazard, equipment limitations, seedling mortality, windthrow hazard, and plant competition

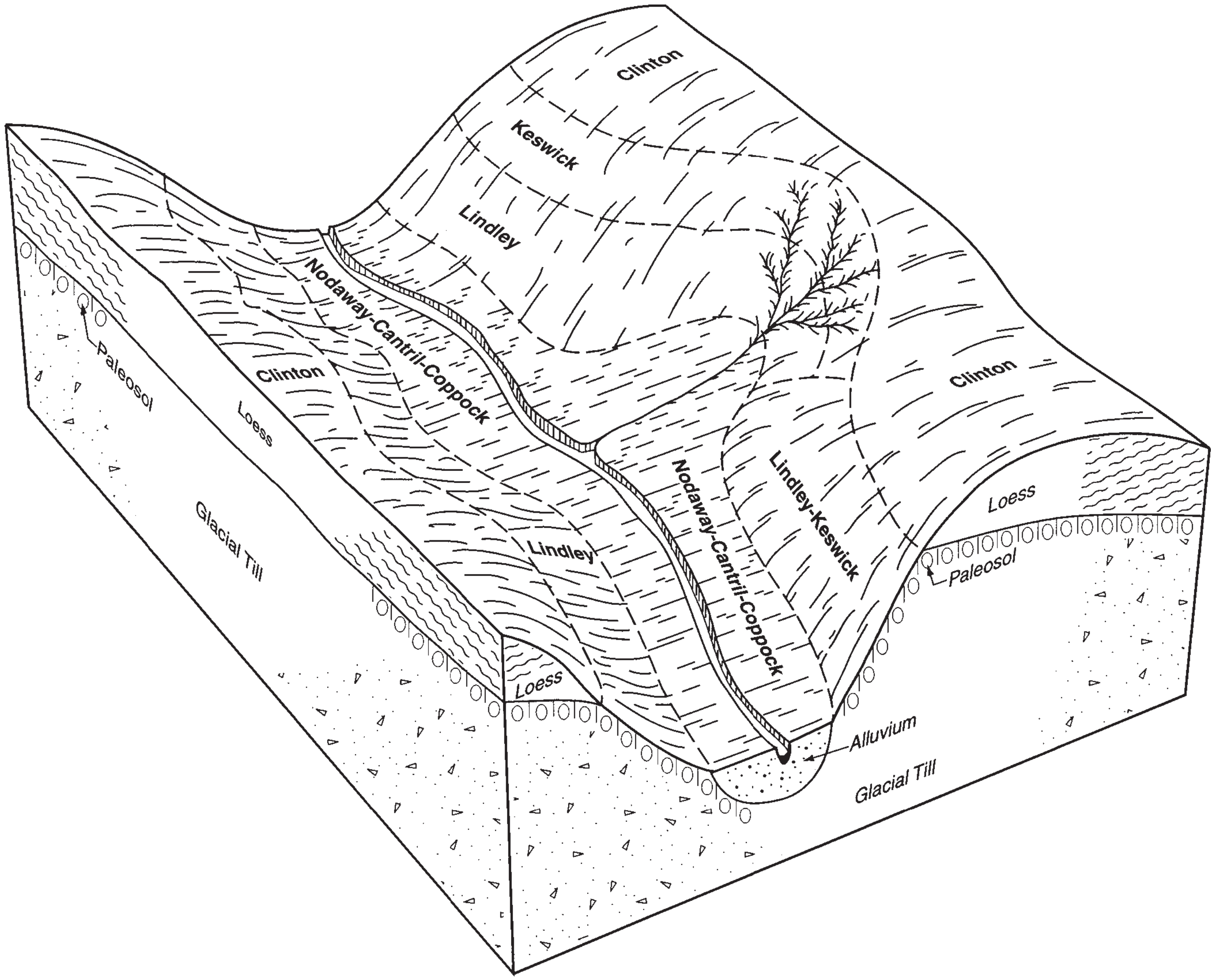

Figure 7.—Typical pattern of soils and parent material in the Clinton-Lindley-Keswick association.

5. Nodaway-Colo-Vesser Association

Nearly level, moderately well drained and poorly drained, silty soils that formed in silty alluvium; on flood plains on bottom land

Setting

Landform and position on the landform: Bottom land
Slope range: 0 to 2 percent

Composition

Extent of the association in the survey area: 12 percent
Extent of the components in the association:
Nodaway soils—47 percent
Colo soils—12 percent
Vesser soils—9 percent
Soils of minor extent—32 percent

Soil Properties and Qualities

Nodaway

Drainage class: Moderately well drained
Parent material: Silty alluvium
Texture of the surface layer: Silt loam

Colo

Drainage class: Poorly drained
Parent material: Silty alluvium
Texture of the surface layer: Silty clay loam

Figure 8.—Hayland and pasture are important land uses in areas of the Clinton-Lindley-Keswick association. These uses help to control erosion in gently sloping to very steep areas.

Vesser

Drainage class: Poorly drained
Parent material: Silty alluvium
Texture of the surface layer: Silt loam

Soils of Minor Extent

- The somewhat poorly drained Ackmore and Amana soils, which formed in silty alluvium
- The poorly drained Chequest and Zook soils, which formed in clayey alluvium

Use and Management

Major uses: Cropland and forestland
Major management considerations affecting cropland: Nodaway—flooding, maintaining fertility; Colo and Vesser—flooding, wetness, maintaining fertility
Major management considerations affecting forestland: Seedling mortality, windthrow hazard, and plant competition

Detailed Soil Map Units

The map units delineated on the detailed soil maps in this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The contrasting components may be mentioned in the map unit descriptions. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Ladoga silt loam, 2 to 5 percent slopes, is a phase of the Ladoga series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are called complexes. A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Olmitz-Vesser-Zook complex, 0 to 5 percent slopes, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits, limestone quarries, is an example.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables give properties of the

soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

8B—Judson silty clay loam, 2 to 5 percent slopes

Component Description

Judson and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Alluvial fans on uplands
Position on the landform: Footslopes and toeslopes
Slope range: 2 to 5 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Silty colluvium
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 13.2 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

8C—Judson silty clay loam, 5 to 9 percent slopes

Component Description

Judson and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Alluvial fans on uplands
Position on the landform: Toeslopes and footslopes
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Silty colluvium
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 13.2 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

13B—Olmitz-Vesser-Zook complex, 0 to 5 percent slopes

Component Description

Olmitz and similar soils

Extent: 30 percent of the unit
Geomorphic setting: Alluvial fans on uplands
Position on the landform: Toeslopes and footslopes
Slope range: 2 to 5 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loamy colluvium
Flooding: None
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 3.4 percent

Vesser and similar soils

Extent: 28 percent of the unit
Geomorphic setting: Drainageways on uplands
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained
Parent material: Silty alluvium
Frequency of flooding: Rare
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 3.0 percent

Zook and similar soils

Extent: 27 percent of the unit
Geomorphic setting: Drainageways on uplands
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Clayey alluvium
Frequency of flooding: Occasional
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 8.5 inches
Content of organic matter in the upper 10 inches: 5.8 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

24D2—Shelby clay loam, 9 to 14 percent slopes, moderately eroded

Component Description

Shelby and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Till
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 2.4 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

24E2—Shelby clay loam, 14 to 18 percent slopes, moderately eroded

Component Description

Shelby and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 14 to 18 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Till
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 2.4 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

51—Vesser silt loam, 0 to 2 percent slopes, occasionally flooded

Component Description

Vesser and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Silty alluvium
Frequency of flooding: Occasional
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

51B—Vesser silt loam, 2 to 5 percent slopes, rarely flooded

Component Description

Vesser and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Uplands
Position on the landform: Toeslopes
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Silty alluvium
Frequency of flooding: Rare
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 3.0 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

54—Zook silty clay, 0 to 2 percent slopes, occasionally flooded

Component Description

Zook and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Clayey alluvium
Frequency of flooding: Occasional
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 8.5 inches
Content of organic matter in the upper 10 inches: 5.8 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about

managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

54+—Zook silt loam, 0 to 2 percent slopes, occasionally flooded, overwash

Component Description

Zook and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Clayey alluvium
Frequency of flooding: Occasional
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 8.8 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

56B—Cantril loam, 2 to 5 percent slopes

Component Description

Cantril and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Alluvial fans on uplands
Position on the landform: Toeslopes and footslopes
Slope range: 2 to 5 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Loamy alluvium or colluvium
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 9.5 inches
Content of organic matter in the upper 10 inches: 3.0 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

56C—Cantril loam, 5 to 9 percent slopes

Component Description

Cantril and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Alluvial fans on uplands
Position on the landform: Toeslopes and footslopes
Slope range: 5 to 9 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Loamy alluvium or colluvium
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 9.5 inches
Content of organic matter in the upper 10 inches: 3.0 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

65D2—Lindley loam, 9 to 14 percent slopes, moderately eroded

Component Description

Lindley and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Till
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 9.6 inches
Content of organic matter in the upper 10 inches: 1.6 percent

Management Considerations

Native plant cover: Forest, prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

65E—Lindley loam, 14 to 18 percent slopes

Component Description

Lindley and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 14 to 18 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Till
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 9.7 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Management Considerations

Native plant cover: Forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

65E2—Lindley loam, 14 to 18 percent slopes, moderately eroded

Component Description

Lindley and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 14 to 18 percent
Texture of the surface layer: Loam

Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Till
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 9.6 inches
Content of organic matter in the upper 10 inches: 1.6 percent

Management Considerations

Native plant cover: Forest, prairie
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

65F—Lindley loam, 18 to 25 percent slopes

Component Description

Lindley and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 18 to 25 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Till
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 9.7 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Management Considerations

Native plant cover: Forest, prairie
Major uses: Pasture and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

65F2—Lindley loam, 18 to 25 percent slopes, moderately eroded

Component Description

Lindley and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 18 to 25 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Till
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 9.6 inches
Content of organic matter in the upper 10 inches: 1.6 percent

Management Considerations

Native plant cover: Forest, prairie
Major uses: Pasture and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”

- “Engineering”
- “Soil Properties”

65G—Lindley loam, 25 to 40 percent slopes

Component Description

Lindley and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 25 to 40 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Till
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 9.6 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Management Considerations

Native plant cover: Forest, prairie
Major uses: Pasture and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

74—Rubio silt loam, 0 to 2 percent slopes

Component Description

Rubio and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Flats on uplands
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 11.2 inches
Content of organic matter in the upper 10 inches: 2.4 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

75—Givin silt loam, 0 to 2 percent slopes

Component Description

Givin and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Flats on uplands
Position on the landform: Summits
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 11.8 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

75B—Givin silt loam, 2 to 5 percent slopes

Component Description

Givin and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Uplands
Position on the landform: Summits
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 11.8 inches
Content of organic matter in the upper 10 inches: 3.0 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

76B—Ladoga silt loam, 2 to 5 percent slopes

Component Description

Ladoga and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Uplands
Position on the landform: Summits
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 3.0 percent

Management Considerations

Native plant cover: Prairie; mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

76B2—Ladoga silty clay loam, 2 to 5 percent slopes, moderately eroded

Component Description

Ladoga and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Summits
Slope range: 2 to 5 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- "Crops and Pasture"
- "Forestland"
- "Recreation"
- "Wildlife Habitat"
- "Engineering"
- "Soil Properties"

76C—Ladoga silt loam, 5 to 9 percent slopes

Component Description

Ladoga and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 11.8 inches
Content of organic matter in the upper 10 inches: 3.0 percent

Management Considerations

Native plant cover: Prairie; mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- "Crops and Pasture"
- "Forestland"
- "Recreation"
- "Wildlife Habitat"
- "Engineering"
- "Soil Properties"

76C2—Ladoga silty clay loam, 5 to 9 percent slopes, moderately eroded

Component Description

Ladoga and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes and summits
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Management Considerations

Native plant cover: Prairie; mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- "Crops and Pasture"
- "Forestland"
- "Recreation"
- "Wildlife Habitat"
- "Engineering"
- "Soil Properties"

76D2—Ladoga silty clay loam, 9 to 14 percent slopes, moderately eroded

Component Description

Ladoga and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)

Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Management Considerations

Native plant cover: Prairie; mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

80B—Clinton silt loam, 2 to 5 percent slopes

Component Description

Clinton and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Interfluves on uplands
Position on the landform: Summits
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 11.4 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Management Considerations

Native plant cover: Forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

80C—Clinton silt loam, 5 to 9 percent slopes

Component Description

Clinton and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 11.4 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Management Considerations

Native plant cover: Forest, prairie
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

80C2—Clinton silty clay loam, 5 to 9 percent slopes, moderately eroded

Component Description

Clinton and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 11.1 inches
Content of organic matter in the upper 10 inches: 1.7 percent

Management Considerations

Native plant cover: Forest, prairie
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

80D—Clinton silt loam, 9 to 14 percent slopes

Component Description

Clinton and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 11.2 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Management Considerations

Native plant cover: Forest, prairie
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

80D2—Clinton silty clay loam, 9 to 14 percent slopes, moderately eroded

Component Description

Clinton and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 11.3 inches
Content of organic matter in the upper 10 inches: 1.7 percent

Management Considerations

Native plant cover: Forest, prairie
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about

managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

87B—Colo-Zook complex, 0 to 3 percent slopes

Component Description

Colo and similar soils

Extent: 68 percent of the unit
Geomorphic setting: Drainageways on uplands
Slope range: 0 to 3 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Silty alluvium
Frequency of flooding: Occasional
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 6.0 percent

Zook and similar soils

Extent: 32 percent of the unit
Geomorphic setting: Drainageways on uplands
Slope range: 0 to 3 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Clayey alluvium
Frequency of flooding: Occasional
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 8.5 inches
Content of organic matter in the upper 10 inches: 5.8 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

93D2—Shelby-Adair complex, 9 to 14 percent slopes, moderately eroded

Component Description

Shelby and similar soils

Extent: 60 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Till
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 2.2 percent

Adair and similar soils

Extent: 40 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Till
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 9.2 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- "Crops and Pasture"
- "Recreation"
- "Wildlife Habitat"
- "Engineering"
- "Soil Properties"

122—Sperry silt loam, 0 to 1 percent slopes

Component Description

Sperry and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Flats on uplands
Position on the landform: Depressions
Slope range: 0 to 1 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Very poorly drained
Parent material: Loess
Flooding: None
Seasonal high water table (in undrained areas): 1 foot above to 1 foot below the surface
Available water capacity to a depth of 60 inches: 12.0 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- "Crops and Pasture"
- "Recreation"
- "Wildlife Habitat"
- "Engineering"
- "Soil Properties"

133—Colo silty clay loam, 0 to 2 percent slopes, occasionally flooded

Component Description

Colo and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Silty alluvium
Frequency of flooding: Occasional
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 6.0 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- "Crops and Pasture"
- "Recreation"
- "Wildlife Habitat"
- "Engineering"
- "Soil Properties"

133+—Colo silt loam, 0 to 2 percent slopes, occasionally flooded, overwash

Component Description

Colo and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Silty alluvium

Frequency of flooding: Occasional
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 4.0 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

133B—Colo silty clay loam, 2 to 5 percent slopes, rarely flooded

Component Description

Colo and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Flood plains
Slope range: 2 to 5 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Silty alluvium
Frequency of flooding: Rare
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 6.0 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

163E—Fayette silt loam, 14 to 18 percent slopes

Component Description

Fayette and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Management Considerations

Native plant cover: Forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

163E2—Fayette silt loam, 14 to 18 percent slopes, moderately eroded

Component Description

Fayette and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands

Position on the landform: Backslopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 11.4 inches
Content of organic matter in the upper 10 inches: 1.7 percent

Management Considerations

Native plant cover: Forest, prairie
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

163F—Fayette silt loam, 18 to 25 percent slopes

Component Description

Fayette and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 18 to 25 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Management Considerations

Native plant cover: Forest, prairie
Major uses: Pasture and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

179D2—Gara clay loam, 9 to 14 percent slopes, moderately eroded

Component Description

Gara and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Till
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Management Considerations

Native plant cover: Prairie; mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

179E—Gara loam, 14 to 18 percent slopes

Component Description

Gara and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 14 to 18 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Till
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 10.7 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

179E2—Gara clay loam, 14 to 18 percent slopes, moderately eroded

Component Description

Gara and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 14 to 18 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Till
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Management Considerations

Native plant cover: Prairie; mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

179F2—Gara clay loam, 18 to 25 percent slopes, moderately eroded

Component Description

Gara and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 18 to 25 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Till
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Management Considerations

Native plant cover: Prairie; mixed prairie and forest
Major uses: Pasture and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”

- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

180—Keomah silt loam, 0 to 2 percent slopes

Component Description

Keomah and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Flats on uplands
Position on the landform: Summits
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

220—Nodaway silt loam, 0 to 2 percent slopes, occasionally flooded

Component Description

Nodaway and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Silty alluvium
Frequency of flooding: Occasional
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 13.2 inches
Content of organic matter in the upper 10 inches: 1.9 percent

Management Considerations

Native plant cover: Prairie; mixed prairie and forest
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

222C—Clarinda silty clay loam, 5 to 9 percent slopes

Component Description

Clarinda and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Gray paleosol weathered from till
Flooding: None
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 9.3 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

222C2—Clarinda silty clay loam, 5 to 9 percent slopes, moderately eroded

Component Description

Clarinda and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Gray paleosol weathered from till
Flooding: None
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 9.2 inches
Content of organic matter in the upper 10 inches: 2.2 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

223C2—Rinda silty clay loam, 5 to 9 percent slopes, moderately eroded

Component Description

Rinda and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Gray paleosol weathered from till
Flooding: None
Depth to seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 10.0 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

273C—Olmitz loam, 5 to 9 percent slopes

Component Description

Olmitz and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Alluvial fans on uplands
Position on the landform: Backslopes
Slope range: 5 to 9 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loamy colluvium
Flooding: None
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 3.4 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections:

- "Crops and Pasture"
- "Recreation"
- "Wildlife Habitat"
- "Engineering"
- "Soil Properties"

279—Taintor silty clay loam, 0 to 2 percent slopes

Component Description

Taintor and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Flats on uplands
Position on the landform: Summits
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Loess
Flooding: None
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 10.6 inches
Content of organic matter in the upper 10 inches: 4.3 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland (fig. 9), hayland, and pasture

Figure 9.—Areas of the poorly drained Taintor silty clay loam, 0 to 2 percent slopes, are well suited to intensive row cropping.

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

280—Mahaska silty clay loam, 0 to 2 percent slopes

Component Description

Mahaska and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Flats on uplands
Position on the landform: Summits
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 5.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

280B—Mahaska silty clay loam, 2 to 5 percent slopes

Component Description

Mahaska and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Uplands
Position on the landform: Summits
Slope range: 2 to 5 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 5.0 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

281B—Otley silty clay loam, 2 to 5 percent slopes

Component Description

Otley and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Uplands
Position on the landform: Summits
Slope range: 2 to 5 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 2 to 4 feet
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

281B2—Otley silty clay loam, 2 to 5 percent slopes, moderately eroded

Component Description

Otley and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Uplands
Position on the landform: Summits
Slope range: 2 to 5 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 2 to 4 feet
Available water capacity to a depth of 60 inches: 11.8 inches
Content of organic matter in the upper 10 inches: 2.6 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

281C—Otley silty clay loam, 5 to 9 percent slopes

Component Description

Otley and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 2 to 4 feet
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

281C2—Otley silty clay loam, 5 to 9 percent slopes, moderately eroded

Component Description

Otley and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 2 to 4 feet
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

281D2—Otley silty clay loam, 9 to 14 percent slopes, moderately eroded

Component Description

Otley and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 2 to 4 feet
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 2.4 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

293C—Chelsea-Fayette complex, 5 to 9 percent slopes

Component Description

Chelsea and similar soils

Extent: 57 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Loamy fine sand
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Excessively drained
Parent material: Eolian sand
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 4.5 inches
Content of organic matter in the upper 10 inches: 0.7 percent

Fayette and similar soils

Extent: 38 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes and summits
Slope range: 5 to 9 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”

- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

293D—Chelsea-Fayette complex, 9 to 14 percent slopes

Component Description

Chelsea and similar soils

Extent: 57 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Loamy fine sand
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Excessively drained
Parent material: Eolian sand
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 4.5 inches
Content of organic matter in the upper 10 inches: 0.7 percent

Fayette and similar soils

Extent: 38 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

293E—Chelsea-Fayette complex, 14 to 18 percent slopes

Component Description

Chelsea and similar soils

Extent: 57 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 14 to 18 percent
Texture of the surface layer: Loamy fine sand
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Excessively drained
Parent material: Eolian sand
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 4.5 inches
Content of organic matter in the upper 10 inches: 0.7 percent

Fayette and similar soils

Extent: 38 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Pasture and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

293F—Chelsea-Fayette complex, 18 to 25 percent slopes

Component Description

Chelsea and similar soils

Extent: 57 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 18 to 25 percent
Texture of the surface layer: Loamy fine sand
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Excessively drained
Parent material: Eolian sand
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 4.5 inches
Content of organic matter in the upper 10 inches: 0.7 percent

Fayette and similar soils

Extent: 38 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 18 to 25 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Pasture and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

294C—Billett, loamy substratum-Ladoga, sandy substratum, complex, 5 to 9 percent slopes

Component Description

Billett and similar soils

Extent: 65 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Fine sandy loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Eolian loamy or sandy sediments
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Ladoga and similar soils

Extent: 35 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes and summits
Slope range: 5 to 9 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)

Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 9.0 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

294D—Billett, loamy substratum-Ladoga, sandy substratum, complex, 9 to 14 percent slopes

Component Description

Billett and similar soils

Extent: 65 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Fine sandy loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Eolian loamy or sandy sediments
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Ladoga and similar soils

Extent: 35 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 9.0 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

313F2—Gosport silty clay loam, 18 to 25 percent slopes, moderately eroded

Component Description

Gosport and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 18 to 25 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Moderately well drained
Parent material: Residuum derived from clayey shale
Flooding: None
Depth to seasonal high water table (in undrained areas): 2 to 4 feet
Available water capacity to a depth of 60 inches: 3.0 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Management Considerations

Native plant cover: Prairie
Major uses: Pasture and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

319E—Dunbarton silt loam, 14 to 18 percent slopes

Component Description

Dunbarton and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 14 to 18 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: 12 to 20 inches to bedrock (lithic)
Drainage class: Well drained
Parent material: Residuum derived from limestone
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 2.6 inches
Content of organic matter in the upper 10 inches: 1.4 percent

Management Considerations

Native plant cover: Forest
Major uses: Pasture and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

422—Amana silt loam, 0 to 2 percent slopes, occasionally flooded

Component Description

Amana and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Silty alluvium
Frequency of flooding: Occasional
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 12.9 inches
Content of organic matter in the upper 10 inches: 4.0 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

423D2—Bucknell silty clay loam, 9 to 14 percent slopes, moderately eroded

Component Description

Bucknell and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained
Parent material: Gray paleosol weathered from till
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 9.3 inches
Content of organic matter in the upper 10 inches: 1.6 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

424D—Lindley-Keswick complex, 9 to 14 percent slopes

Component Description

Lindley and similar soils

Extent: 52 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Till
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 9.7 inches
Content of organic matter in the upper 10 inches: 1.9 percent

Keswick and similar soils

Extent: 43 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Reddish paleosol weathered from till
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 8.7 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

424D2—Lindley-Keswick complex, 9 to 14 percent slopes, moderately eroded

Component Description

Lindley and similar soils

Extent: 52 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Till
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 9.6 inches
Content of organic matter in the upper 10 inches: 1.6 percent

Keswick and similar soils

Extent: 43 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Reddish paleosol weathered from till
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 8.5 inches
Content of organic matter in the upper 10 inches: 1.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

424E2—Lindley-Keswick complex, 14 to 18 percent slopes, moderately eroded

Component Description

Lindley and similar soils

Extent: 48 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Slope range: 14 to 18 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Till
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 9.6 inches
Content of organic matter in the upper 10 inches: 1.6 percent

Keswick and similar soils

Extent: 42 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Slope range: 14 to 18 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Reddish paleosol weathered from till
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 8.5 inches
Content of organic matter in the upper 10 inches: 1.0 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

425D—Keswick loam, 9 to 14 percent slopes

Component Description

Keswick and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained
Parent material: Reddish paleosol weathered from till
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 8.7 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

425D2—Keswick clay loam, 9 to 14 percent slopes, moderately eroded

Component Description

Keswick and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Reddish paleosol weathered from till
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 8.5 inches
Content of organic matter in the upper 10 inches: 1.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

428B—Ely silty clay loam, 2 to 5 percent slopes

Component Description

Ely and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Alluvial fans on uplands
Position on the landform: Toeslopes and footslopes
Slope range: 2 to 5 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Silty colluvium
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 12.1 inches
Content of organic matter in the upper 10 inches: 5.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

430—Ackmore silt loam, 0 to 2 percent slopes, occasionally flooded

Component Description

Ackmore and similar soils

Extent: 90 percent of the unit

Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Silty alluvium
Frequency of flooding: Occasional
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 12.0 inches
Content of organic matter in the upper 10 inches: 2.0 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

453—Tuskeego silt loam, 0 to 2 percent slopes, occasionally flooded

Component Description

Tuskeego and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Stream terraces
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Clayey alluvium
Frequency of flooding: Occasional
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 10.0 inches
Content of organic matter in the upper 10 inches: 3.3 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

520—Coppock silt loam, 0 to 2 percent slopes, occasionally flooded

Component Description

Coppock and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Silty alluvium
Frequency of flooding: Occasional
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

520B—Coppock silt loam, 2 to 5 percent slopes, rarely flooded

Component Description

Coppock and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Alluvial fans
Position on the landform: Toeslopes and footslopes
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Silty alluvium
Frequency of flooding: Rare
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

570C—Nira silty clay loam, 5 to 9 percent slopes

Component Description

Nira and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 2 to 4 feet
Available water capacity to a depth of 60 inches: 11.7 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

570C2—Nira silty clay loam, 5 to 9 percent slopes, moderately eroded

Component Description

Nira and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 2 to 4 feet
Available water capacity to a depth of 60 inches: 11.6 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”

- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

571C2—Hedrick silty clay loam, 5 to 9 percent slopes, moderately eroded

Component Description

Hedrick and similar soils

Extent: 89 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Deoxidized loess and the underlying gray paleosol derived from till
Flooding: None
Depth to seasonal high water table (in undrained areas): 2 to 4 feet
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 1.9 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

571D2—Hedrick silty clay loam, 9 to 14 percent slopes, moderately eroded

Component Description

Hedrick and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Deoxidized loess and the underlying gray paleosol derived from till
Flooding: None
Depth to seasonal high water table (in undrained areas): 2 to 4 feet
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 1.9 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

572C2—Inton silty clay loam, 5 to 9 percent slopes, moderately eroded

Component Description

Inton and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Deoxidized loess and the underlying gray paleosol derived from till
Flooding: None
Depth to seasonal high water table (in undrained areas): 2 to 4 feet
Available water capacity to a depth of 60 inches: 11.2 inches

Content of organic matter in the upper 10 inches: 1.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

572D2—Inton silty clay loam, 9 to 14 percent slopes, moderately eroded

Component Description

Inton and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Deoxidized loess and the underlying gray paleosol derived from till
Flooding: None
Depth to seasonal high water table (in undrained areas): 2 to 4 feet
Available water capacity to a depth of 60 inches: 11.0 inches
Content of organic matter in the upper 10 inches: 1.9 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

587—Chequest silty clay loam, 0 to 2 percent slopes, occasionally flooded

Component Description

Chequest and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Clayey alluvium
Frequency of flooding: Occasional
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 10.0 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

587+—Chequest silt loam, 0 to 2 percent slopes, occasionally flooded, overwash

Component Description

Chequest and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)

Drainage class: Poorly drained
Parent material: Clayey alluvium
Frequency of flooding: Occasional
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 10.3 inches
Content of organic matter in the upper 10 inches: 2.0 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

687B—Watkins silt loam, 2 to 5 percent slopes

Component Description

Watkins and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Stream terraces
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Silty alluvium
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 3.0 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

688—Koszta silt loam, 0 to 2 percent slopes

Component Description

Koszta and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Stream terraces
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Silty alluvium
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

722—Nodaway-Ackmore-Vesser complex, 0 to 2 percent slopes, occasionally flooded

Component Description

Nodaway and similar soils

Extent: 36 percent of the unit
Geomorphic setting: Flood plains

Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Silty alluvium
Frequency of flooding: Occasional
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 13.2 inches
Content of organic matter in the upper 10 inches: 1.9 percent

Ackmore and similar soils

Extent: 32 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Silty alluvium
Frequency of flooding: Occasional
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 12.0 inches
Content of organic matter in the upper 10 inches: 2.0 percent

Vesser and similar soils

Extent: 22 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Silty alluvium
Frequency of flooding: Occasional
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

730B—Nodaway, occasionally flooded-Coppock-Cantril, rarely flooded, complex, 2 to 5 percent slopes

Component Description

Nodaway and similar soils

Extent: 46 percent of the unit
Geomorphic setting: Drainageways on uplands
Slope range: 2 to 3 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Silty alluvium
Frequency of flooding: Occasional
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 13.2 inches
Content of organic matter in the upper 10 inches: 1.9 percent

Coppock and similar soils

Extent: 27 percent of the unit
Geomorphic setting: Drainageways on uplands
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Silty alluvium
Frequency of flooding: Rare
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Cantril and similar soils

Extent: 17 percent of the unit
Geomorphic setting: Drainageways on uplands
Position on the landform: Toeslopes and footslopes
Slope range: 2 to 5 percent
Texture of the surface layer: Loam

Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Loamy alluvium or colluvium
Frequency of flooding: Rare
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 9.5 inches
Content of organic matter in the upper 10 inches: 3.0 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- "Crops and Pasture"
- "Forestland"
- "Recreation"
- "Wildlife Habitat"
- "Engineering"
- "Soil Properties"

779—Kalona silty clay loam, 0 to 2 percent slopes

Component Description

Kalona and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Flats on uplands
Position on the landform: Summits
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Loess
Flooding: None
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 10.4 inches
Content of organic matter in the upper 10 inches: 5.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- "Crops and Pasture"
- "Recreation"
- "Wildlife Habitat"
- "Engineering"
- "Soil Properties"

792C2—Armstrong clay loam, 5 to 9 percent slopes, moderately eroded

Component Description

Armstrong and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Reddish paleosol weathered from till
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 9.0 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- "Crops and Pasture"
- "Forestland"
- "Recreation"
- "Wildlife Habitat"
- "Engineering"
- "Soil Properties"

792D2—Armstrong clay loam, 9 to 14 percent slopes, moderately eroded

Component Description

Armstrong and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Reddish paleosol weathered from till
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 9.0 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

795C2—Ashgrove silty clay loam, 5 to 9 percent slopes, moderately eroded

Component Description

Ashgrove and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes and shoulders
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Grayish paleosol weathered from till
Flooding: None
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 8.2 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Management Considerations

Native plant cover: Forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

795D2—Ashgrove silty clay loam, 9 to 14 percent slopes, moderately eroded

Component Description

Ashgrove and similar soils

Extent: 82 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Grayish paleosol weathered from till
Flooding: None
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 8.2 inches
Content of organic matter in the upper 10 inches: 1.2 percent

Management Considerations

Native plant cover: Forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about

managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

822D2—Lamoni silty clay loam, 9 to 14 percent slopes, moderately eroded

Component Description

Lamoni and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Grayish paleosol weathered from till
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 9.2 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

876B—Ladoga silt loam, terrace, 2 to 5 percent slopes

Component Description

Ladoga and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Stream terraces
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 3.0 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

876C2—Ladoga silty clay loam, terrace, 5 to 9 percent slopes, moderately eroded

Component Description

Ladoga and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Risers on stream terraces
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

876D2—Ladoga silty clay loam, terrace, 9 to 14 percent slopes, moderately eroded

Component Description

Ladoga and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Risers on stream terraces
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 11.5 inches
Content of organic matter in the upper 10 inches: 2.1 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

880B—Clinton silt loam, terrace, 2 to 5 percent slopes

Component Description

Clinton and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Stream terraces
Slope range: 2 to 5 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 11.4 inches
Content of organic matter in the upper 10 inches: 2.5 percent

Management Considerations

Native plant cover: Forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

880C2—Clinton silty clay loam, terrace, 5 to 9 percent slopes, moderately eroded

Component Description

Clinton and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Risers on stream terraces
Slope range: 5 to 9 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess

Flooding: None
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 1.7 percent

Management Considerations

Native plant cover: Forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

880D2—Clinton silty clay loam, terrace, 9 to 14 percent slopes, moderately eroded

Component Description

Clinton and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Risers on stream terraces
Slope range: 9 to 14 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 1.7 percent

Management Considerations

Native plant cover: Forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

881B—Otley silty clay loam, terrace, 2 to 5 percent slopes

Component Description

Otley and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Stream terraces
Slope range: 2 to 5 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 2 to 4 feet
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

911B—Colo-Ely complex, 2 to 5 percent slopes

Component Description

Colo and similar soils

Extent: 57 percent of the unit
Geomorphic setting: Drainageways on uplands
Slope range: 2 to 5 percent
Texture of the surface layer: Silty clay loam

Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Silty alluvium
Frequency of flooding: Occasional
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 12.5 inches
Content of organic matter in the upper 10 inches: 6.0 percent

Ely and similar soils

Extent: 38 percent of the unit
Geomorphic setting: Drainageways on uplands
Slope range: 2 to 5 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Silty colluvium
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 12.1 inches
Content of organic matter in the upper 10 inches: 5.0 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

993D2—Gara-Armstrong complex, 9 to 14 percent slopes, moderately eroded

Component Description

Gara and similar soils

Extent: 48 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Till
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Armstrong and similar soils

Extent: 42 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Reddish paleosol weathered from till
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 9.0 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

993E2—Gara-Armstrong complex, 14 to 18 percent slopes, moderately eroded

Component Description

Gara and similar soils

Extent: 48 percent of the unit

Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 14 to 18 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Well drained
Parent material: Till
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 10.2 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Armstrong and similar soils

Extent: 42 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 14 to 18 percent
Texture of the surface layer: Clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Reddish paleosol weathered from till
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 9.0 inches
Content of organic matter in the upper 10 inches: 2.3 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

994D2—Galland-Douds complex, 9 to 14 percent slopes, moderately eroded

Component Description

Galland and similar soils

Extent: 65 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 9 to 14 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Reddish alluvial sediments derived from glaciers
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 9.7 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Douds and similar soils

Extent: 25 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Slope range: 9 to 14 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Alluvial sediments derived from glaciers
Flooding: None
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 9.4 inches
Content of organic matter in the upper 10 inches: 1.6 percent

Management Considerations

Native plant cover: Forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

994E2—Galland-Douds complex, 14 to 18 percent slopes, moderately eroded

Component Description

Galland and similar soils

Extent: 55 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 14 to 18 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Reddish alluvial sediments derived from glaciers
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 10.1 inches
Content of organic matter in the upper 10 inches: 1.3 percent

Douds and similar soils

Extent: 35 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Slope range: 14 to 18 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Alluvial sediments derived from glaciers
Flooding: None
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 9.3 inches
Content of organic matter in the upper 10 inches: 1.4 percent

Management Considerations

Native plant cover: Forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

999F—Nordness-Eleva complex, 18 to 25 percent slopes

Component Description

Nordness and similar soils

Extent: 62 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 18 to 25 percent
Texture of the surface layer: Loam
Depth to restrictive feature: 8 to 20 inches to bedrock (lithic)
Drainage class: Well drained
Parent material: Residuum derived from limestone
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 2.0 inches
Content of organic matter in the upper 10 inches: 1.9 percent

Eleva and similar soils

Extent: 23 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 18 to 25 percent
Texture of the surface layer: Sandy loam
Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Well drained
Parent material: Loamy deposits
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 2.9 inches

Content of organic matter in the upper 10 inches: 1.1 percent

Management Considerations

Native plant cover: Forest
Major uses: Pasture and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

999G—Nordness-Eleva complex, 25 to 40 percent slopes

Component Description

Nordness and similar soils

Extent: 62 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 25 to 40 percent
Texture of the surface layer: Loam
Depth to restrictive feature: 8 to 20 inches to bedrock (lithic) (fig. 10)
Drainage class: Well drained
Parent material: Residuum derived from limestone
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 2.0 inches
Content of organic matter in the upper 10 inches: 1.9 percent

Eleva and similar soils

Extent: 23 percent of the unit
Geomorphic setting: Head slopes, nose slopes, and side slopes in the uplands
Position on the landform: Backslopes
Slope range: 25 to 40 percent
Texture of the surface layer: Sandy loam
Depth to restrictive feature: 20 to 40 inches to bedrock (paralithic)
Drainage class: Well drained
Parent material: Loamy deposits
Flooding: None
Depth to seasonal high water table (in undrained areas): More than 6 feet
Available water capacity to a depth of 60 inches: 2.9 inches
Content of organic matter in the upper 10 inches: 1.1 percent

Management Considerations

Native plant cover: Prairie
Major uses: Pasture and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

1075—Givin silt loam, terrace, 0 to 2 percent slopes

Component Description

Givin and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Stream terraces
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 11.8 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Cropland, hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”

Figure 10.—Bedrock outcrops are common in areas of Nordness-Eleva complex, 25 to 40 percent slopes.

- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

1220—Nodaway silt loam, channeled, 0 to 2 percent slopes, frequently flooded

Component Description

Nodaway and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Silty alluvium
Frequency of flooding: Frequent
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 13.2 inches
Content of organic matter in the upper 10 inches: 1.9 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Hayland and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

1279—Taintor silty clay loam, terrace, 0 to 2 percent slopes

Component Description

Taintor and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Stream terraces
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Loess
Flooding: None
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 10.6 inches
Content of organic matter in the upper 10 inches: 4.3 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

1280—Mahaska silty clay loam, terrace, 0 to 2 percent slopes

Component Description

Mahaska and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Stream terraces
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Loess
Flooding: None
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 10.9 inches
Content of organic matter in the upper 10 inches: 5.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Cropland, hayland, and pasture

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

1315—Nodaway-Klum complex, channeled, 0 to 2 percent slopes, frequently flooded

Component Description

Nodaway and similar soils

Extent: 57 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Silty alluvium
Frequency of flooding: Frequent
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 13.2 inches
Content of organic matter in the upper 10 inches: 1.9 percent

Klum and similar soils

Extent: 38 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent

Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loamy alluvium
Frequency of flooding: Frequent
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 6.9 inches
Content of organic matter in the upper 10 inches: 1.7 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Hayland, pasture, and forestland

For general and detailed information about managing this map unit, see the following sections of this publication:

- "Crops and Pasture"
- "Forestland"
- "Recreation"
- "Wildlife Habitat"
- "Engineering"
- "Soil Properties"

5010—Pits, sand and gravel

Component Description

Definition: This map unit consists of areas on stream terraces and moraines from which sand and gravel have been removed.
Extent: 100 percent of the unit

Management Considerations

Major use: Wildlife habitat

For general and detailed information about managing this map unit, see the following sections of this publication:

- "Recreation"
- "Wildlife Habitat"

5020—Pits and Dumps

Component Description

Definition: This map unit consists of areas that have been strip mined for coal.
Extent: 100 percent of the unit

Management Considerations

Major use: Wildlife habitat

For general and detailed information about managing this map unit, see the following sections of this publication:

- "Recreation"
- "Wildlife Habitat"

5030—Pits, limestone quarries

Component Description

Definition: This map unit consists of areas from which limestone has been removed (fig. 11).
Extent: 100 percent of the unit

Management Considerations

Major use: Wildlife habitat

For general and detailed information about managing this map unit, see the following sections of this publication:

- "Recreation"
- "Wildlife Habitat"

5040—Orthents, loamy

Component Description

Definition: This map unit consists of areas where large amounts of soil material have been removed or added. The material that is removed is used for roadways, buildings, or other structures.
Extent: 100 percent of the unit

Management Considerations

Major use: Wildlife habitat

For general and detailed information about managing this map unit, see the following sections of this publication:

- "Recreation"
- "Wildlife Habitat"

5048—Aquents, ponded, frequently flooded

Component Description

Definition: This map unit consists of wet soils on flood plains. These soils are frequently flooded.

Figure 11.—An area of Pits, limestone quarries. The limestone bedrock is used for road construction and other building projects and for agricultural lime.

Extent: 100 percent of the unit
Slope range: 0 to 1 percent

Management Considerations

Major use: Wildlife habitat

For general and detailed information about managing this map unit, see the following sections of this publication:

- "Recreation"
- "Wildlife Habitat"

5060—Pits, clay

Component Description

Definition: This map unit consist of areas from which clay has been removed.
Extent: 100 percent of the unit

Management Considerations

Major uses: Wildlife habitat

For general and detailed information about

managing this map unit, see the following sections of this publication:

- "Recreation"
- "Wildlife Habitat"

5080—Orthents, sanitary landfill

Component Description

Definition: This map unit consists of areas used as sanitary landfills. The soil is excavated, waste is deposited, and the waste is covered with excavated soil material.
Extent: 100 percent of the unit

Management Considerations

Major uses: Wildlife habitat

For general and detailed information about managing this map unit, see the following sections of this publication:

- "Recreation"
- "Wildlife Habitat"

6051—Vesser silt loam, 0 to 2 percent slopes, frequently flooded

Component Description

Vesser and similar soils

Extent: 93 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Silty alluvium
Frequency of flooding: Frequent
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Pasture and wildlife habitat

For general and detailed information about managing this map unit, see the following sections of this publication:

- "Crops and Pasture"
- "Recreation"
- "Wildlife Habitat"
- "Engineering"
- "Soil Properties"

6054—Zook silty clay loam, 0 to 2 percent slopes, frequently flooded

Component Description

Zook and similar soils

Extent: 95 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Clayey alluvium
Frequency of flooding: Frequent
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 8.5 inches
Content of organic matter in the upper 10 inches: 5.8 percent

Management Considerations

Native plant cover: Prairie
Major uses: Pasture and wildlife habitat

For general and detailed information about managing this map unit, see the following sections of this publication:

- "Crops and Pasture"
- "Recreation"
- "Wildlife Habitat"
- "Engineering"
- "Soil Properties"

6133—Colo silty clay loam, 0 to 2 percent slopes, frequently flooded

Component Description

Colo and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)

Drainage class: Poorly drained
Parent material: Silty alluvium
Frequency of flooding: Frequent
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 6.0 percent

Management Considerations

Native plant cover: Prairie
Major uses: Pasture and wildlife habitat

For general and detailed information about managing this map unit, see the following sections of this publication:

- "Crops and Pasture"
- "Recreation"
- "Wildlife Habitat"
- "Engineering"
- "Soil Properties"

6133+—Colo silt loam, 0 to 2 percent slopes, frequently flooded, overwash

Component Description

Colo and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Silty alluvium
Frequency of flooding: Frequent
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 11.9 inches
Content of organic matter in the upper 10 inches: 4.0 percent

Management Considerations

Native plant cover: Prairie
Major uses: Pasture and wildlife habitat

For general and detailed information about managing this map unit, see the following sections of this publication:

- "Crops and Pasture"
- "Recreation"
- "Wildlife Habitat"
- "Engineering"
- "Soil Properties"

6220—Nodaway silt loam, 0 to 2 percent slopes, frequently flooded

Component Description

Nodaway and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Silty alluvium
Frequency of flooding: Frequent
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 13.2 inches
Content of organic matter in the upper 10 inches: 1.9 percent

Management Considerations

Native plant cover: Prairie
Major uses: Pasture and wildlife habitat

For general and detailed information about managing this map unit, see the following sections of this publication:

- "Crops and Pasture"
- "Forestland"
- "Recreation"
- "Wildlife Habitat"
- "Engineering"
- "Soil Properties"

6315—Nodaway-Klum complex, 0 to 2 percent slopes, frequently flooded

Component Description

Nodaway and similar soils

Extent: 57 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained

Parent material: Silty alluvium
Frequency of flooding: Frequent
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 13.2 inches
Content of organic matter in the upper 10 inches: 1.9 percent

Klum and similar soils

Extent: 38 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Parent material: Loamy alluvium
Frequency of flooding: Frequent
Depth to seasonal high water table (in undrained areas): 4 to 6 feet
Available water capacity to a depth of 60 inches: 6.9 inches
Content of organic matter in the upper 10 inches: 1.7 percent

Management Considerations

Native plant cover: Mixed prairie and forest
Major uses: Pasture and wildlife habitat

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

6422—Amana silt loam, 0 to 2 percent slopes, frequently flooded

Component Description

Amana and similar soils

Extent: 89 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silt loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Parent material: Silty alluvium
Frequency of flooding: Frequent
Depth to seasonal high water table (in undrained areas): 1.0 to 3.5 feet
Available water capacity to a depth of 60 inches: 12.9 inches
Content of organic matter in the upper 10 inches: 4.0 percent

Management Considerations

Native plant cover: Prairie
Major uses: Pasture and wildlife habitat

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

6587—Chequest silty clay loam, 0 to 2 percent slopes, frequently flooded

Component Description

Chequest and similar soils

Extent: 90 percent of the unit
Geomorphic setting: Flood plains
Slope range: 0 to 2 percent
Texture of the surface layer: Silty clay loam
Depth to restrictive feature: Very deep (more than 60 inches)
Drainage class: Poorly drained
Parent material: Clayey alluvium
Frequency of flooding: Frequent
Seasonal high water table (in undrained areas): At the surface to 1 foot below the surface
Available water capacity to a depth of 60 inches: 10.0 inches
Content of organic matter in the upper 10 inches: 3.5 percent

Management Considerations

Native plant cover: Prairie
Major uses: Pasture and wildlife habitat

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Crops and Pasture”
- “Forestland”
- “Recreation”
- “Wildlife Habitat”
- “Engineering”
- “Soil Properties”

AW—Animal waste

Component Description

Definition: This map unit consists of a shallow pond constructed to hold animal waste from farm feedlots.

Management Considerations

Native plant cover: Prairie

SL—Sewage lagoon

Component Description

Definition: This map unit consists of shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid waste.

Management Considerations

Native plant cover: Prairie

W—Water

Component Description

Definition: This map unit consists of natural bodies of water.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The estimated yields of the main crops and pasture plants are listed, the system of land capability classification used by the Natural Resources Conservation Service is explained, and prime farmland is described.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading “Detailed Soil Map Units.” Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

In 1996, about 211,980 acres in Keokuk County, or 57 percent of the total acreage, was harvested for crops (Sands, 1997). The main crops are corn and soybeans. Legume-grass mixtures are the major hay crops. The acreage used for row crops has decreased in recent years, and the extent of hay crops, pasture, and other land uses has increased slightly. Productivity could be increased and soil conservation enhanced by applying the latest crop production technology to all cropland in the county. This soil survey is an important resource in the application of such technology.

The main management needs on the cropland and pasture in Keokuk County are measures that help to control erosion, measures that maintain the drainage system in areas of naturally wet soils and in seepy areas, and measures that maintain or improve fertility and tilth.

Water erosion is the major problem on about one-half of the cropland and pasture in Keokuk County. It is a hazard in areas where the slope is more than 2 percent. Loss of the surface layer through erosion reduces the productivity of soils and results in the sedimentation of streams. Productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils in which the subsoil is low in fertility, such as Armstrong soils, and on soils that have a clayey subsoil, such as Rinda and Clarinda soils. Preparing a good seedbed and tilling are difficult on eroded soils because the original friable surface layer has been removed or thinned. The subsoil in areas of these soils commonly is hard and cloddy after rains or if it has been tilled when wet. Runoff from eroding soils commonly deposits sediment in streams, drainageways, and road ditches.

Controlling this erosion not only helps to maintain the productivity of soils but also improves the quality of water for municipal and recreational uses and for fish and wildlife.

Because of the wide range in soils and landscape features, a variety of erosion-control measures are needed in Keokuk County. The best measures provide a protective cover of plants or crop residue, reduce the runoff rate, and increase the rate of water infiltration. Examples of these measures are cover crops, contour stripcropping, contour farming, terraces and diversions, field borders and grassed waterways, and conservation tillage. Generally, a combination of several measures is most effective.

A cropping system that keeps a plant cover on the surface for extended periods can hold soil losses to an amount that will not reduce the productive capacity of the soils. On livestock farms, where part of the acreage is hayland or pasture, forage crops of grasses and legumes not only provide nitrogen and improve tilth for the next cropping season but also provide a protective plant cover (fig. 12).

A conservation tillage system that leaves a protective amount of crop residue on the surface after planting is effective in controlling erosion, especially on the more sloping soils. Examples of conservation tillage systems are no-till, strip-till, and mulch tillage. No-till is a system in which the soil is left undisturbed before planting. Planting is completed in a narrow slot created by the planter or drill. Strip-till also is a system in which the seedbed is prepared and the seed planted in one operation. Tillage is limited to a strip no wider than one-third of the row. Mulch tillage is a system in which the soil is loosened throughout the field and part of the crop residue is incorporated into the soil. Seedbed preparation and planting can be completed in one operation or in separate operations.

Terraces and diversions control runoff and erosion by reducing the length of slopes (fig. 13). They are most effective on well drained or moderately well drained, gently sloping or moderately sloping soils that have smooth slopes. They are less effective in areas where slopes are irregular or too steep. Tile-intake terraces help to prevent the accumulation of runoff.

Figure 12.—The legume hay crop in this area of Clinton silty clay loam, 9 to 14 percent slopes, moderately eroded, helps to control erosion by providing a protective cover of vegetation. It also provides nitrogen and improves tilth for the next growing season.

Figure 13.—Terraces in this area of Ladoga silty clay loam, 5 to 9 percent slopes, moderately eroded, are designed to reduce the length of slopes and thus reduce the hazard of sheet and rill erosion. They also improve water quality.

If terraces are constructed on soils that formed in loess, such as Otley, Nira, Ladoga, and Hedrick soils, incorporation of the more slowly permeable adjacent soils, such as Bucknell, Clarinda, and Rinda, should be avoided or minimized. Because of the high content of clay in the more slowly permeable soils, designing and building the terraces and revegetating the terrace slopes are difficult and seepage can be a problem following construction. In areas of Gara, Lindley, and other soils having a subsoil that formed partly or entirely in glacial till, the topsoil should be stockpiled when the terraces are constructed and the exposed subsoil should be covered after construction is complete. Diversion terraces commonly are constructed upslope from the Olmitz soils on footslopes. These terraces help to control the runoff from the adjacent uplands.

Contour farming and contour stripcropping effectively control erosion in Keokuk County. They are most effective on soils that have smooth, uniform slopes, such as Mahaska, Otley, and Ladoga soils. Gully-control structures, grassed waterways, and farm ponds help to control erosion in watercourses. The farm ponds also provide a supply of water for livestock and for recreation.

Further information about measures that control erosion is available at the local office of the Natural Resources Conservation Service.

Drainage is a major management concern on about 18 percent of the acreage in Keokuk County. A drainage system typically is needed in areas of the Ackmore, Chequest, Colo, Coppock, Vesser, and Zook soils on flood plains and in areas of the Taintor, Kalona, Sperry, and Rubio soils on uplands.

Maintaining a drainage system in poorly drained or very poorly drained soils generally increases productivity and expands the choice of crops that can be grown. The slow or very slow permeability in Armstrong, Clarinda, Rinda, and other soils that formed in a paleosol on uplands commonly results in seepy areas. Installing lateral interceptor tile drains upslope from the slowly permeable or very slowly permeable soils helps to intercept and drain the excess moisture at the point where loess and glacial till are in contact.

Frequent flooding is a major concern on about 5 percent of the acreage in the county. About 40 percent of the frequently flooded areas are channeled and vegetated with trees. Most of the remaining areas that are frequently flooded are used as cropland. Planting

in these areas is usually delayed because of springtime flooding. Summertime flooding in these areas often causes considerable damage to crops. Replanting of crops may be needed in areas that have been destroyed by flooding. Crop yields on soils that are frequently flooded are significantly lower than yields in areas of similar soils that are only occasionally flooded. Wetland conservation programs have been established to assist landowners in managing soils in frequently flooded areas. The latest information about managing frequently flooded areas can be obtained from the local office of the Natural Resources Conservation Service.

Soil fertility is affected by the supply of available phosphorus and potassium in the subsoil, by reaction, and by the content of organic matter in the surface layer. There is a wide range in fertility levels of the soils in Keokuk County. In most of the soils, the supply of available phosphorus and potassium is high and reaction is neutral to strongly acid.

On acid soils, applications of ground limestone are needed to promote good plant growth. On all soils, the kinds and amounts of lime and fertilizer to be applied should be based on the results of soil tests, the needs of the crop, and the expected level of yields. Soil tests generally provide the most beneficial information. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime that should be applied.

Tilth is an important factor in the germination of seeds and in the infiltration of water into the soil. Soils that have good tilth generally have a high content of organic matter and are granular and porous. In most of the uneroded upland soils that formed under prairie grasses, the content of organic matter in the surface layer is about 3.0 to 4.5 percent. In the eroded upland soils that formed under prairie grasses, it ranges from less than 1 percent to 3 percent, depending on the degree of erosion that has taken place. The content of organic matter also ranges from less than 1 percent to 3 percent in Armstrong, Bucknell, Gara, Keswick, and Lindley soils, which commonly have an accumulation of large stones on the surface. Unless they are removed, these stones can hinder fieldwork.

Most of the permanent pastures in the county support bluegrass. Some are renovated and support birdsfoot trefoil or crownvetch. Other suitable species that are grown in the pastured areas are bromegrass, reed canarygrass, orchardgrass, switchgrass, big bluestem, indiangrass, alfalfa, red clover, and ladino clover. Most of the bluegrass pastures are not used as cropland because the soils are too steep for cultivation. Measures that prevent overgrazing and thus also prevent surface compaction and gully erosion are needed, especially in the steeper areas. Maximum production of grasses and legumes can be achieved if the pasture is properly managed. Applications of fertilizer, weed and brush control, pasture rotation, deferred grazing, proper stocking rates, restricted use during wet periods, and adequate livestock watering facilities help to keep the pasture in good condition.

Erosion is a severe hazard if the plant cover is destroyed when the more sloping pastures are renovated. Interseeding the grasses and legumes into the existing sod eliminates the need for destroying the plant cover during seedbed preparation. If cultivated crops are to be grown before seeding, soil losses can be reduced by conservation tillage, contour farming, and grassed waterways.

Many of the field crops suited to the soils and climate in Keokuk County are not commonly grown. These include sorghum and milo, used mainly for silage; wheat; barley; various pasture grasses; various native grasses, such as bluestem, switchgrass, and indiangrass, which produce grass seed; sweet corn; nursery stock; early vegetables; and certain orchard crops. The latest information about managing the soils for these crops can be obtained from local offices of the Cooperative Extension Service and the Natural Resources Conservation Service.

Cropland Management Considerations

The management concerns affecting the use of the detailed soil map units for crops are shown in table 5. The main concerns in managing nonirrigated cropland are conserving moisture, controlling wind erosion and water erosion, and maintaining soil fertility.

Conserving moisture consists primarily of reducing the evaporation and runoff rates and increasing the water infiltration rate. Applying conservation tillage and conservation cropping systems, farming on the contour, stripcropping, establishing field windbreaks, and leaving crop residue on the surface conserve moisture.

Generally, a combination of several practices is needed to control *wind erosion* and *water erosion.* Conservation tillage, stripcropping, field windbreaks, contour farming, conservation cropping systems, crop residue management, terraces, diversions, and grassed waterways help to prevent excessive soil loss.

Measures that are effective in *maintaining soil fertility* include applying fertilizer, both organic and inorganic, including manure; incorporating crop residue or green manure crops into the soil; and using proper crop rotations. Controlling erosion helps to prevent the loss of organic matter and plant nutrients

and thus helps to maintain productivity, although the level of fertility can be reduced even in areas where erosion is controlled. All soils used for nonirrigated crops respond well to applications of fertilizer.

Some of the considerations shown in the table cannot be easily overcome. These are *channels, flooding, gullies,* and *ponding.*

Additional considerations are as follows:

Lime content, limited available water capacity, potential poor tilth and compaction, and *restricted permeability.*—These limitations can be minimized by incorporating green manure crops, manure, or crop residue into the soil; applying a system of conservation tillage; and using conservation cropping systems. Also, crops may respond well to additions of phosphate fertilizer in areas of soils that have a high content of lime.

Potential for ground-water contamination.—The proper use of nutrients and pesticides can reduce the risk of ground-water contamination.

Potential for surface-water contamination.—The risk of surface-water contamination can be reduced by the proper use of nutrients and pesticides and by conservation farming practices that reduce the runoff rate.

Surface crusting.—This limitation retards seedling development after periods of heavy rainfall.

Surface rock fragments.—This limitation causes rapid wear of tillage equipment. It cannot be easily overcome.

Surface stones.—Stones or boulders on or near the surface can hinder normal tillage unless they are removed.

Salt content.—In areas where this is a limitation, only salt-tolerant crops should be grown.

On irrigated soils the main management concerns are efficient water use, nutrient management, control of erosion, pest and weed control, and timely planting and harvesting for a successful crop. An irrigation system that provides optimum control and distribution of water at minimum cost is needed. Overirrigation wastes water, leaches plant nutrients, and causes erosion. Also, it can increase wetness and soil salinity.

Explanation of Criteria

Acid soil.—The pH is less than 6.1.

Channeled.—The word “channeled” is included in the map unit name.

Dense layer.—The bulk density is 1.80 g/cc or greater within the soil profile.

Depth to rock.—The depth to bedrock is less than 40 inches.

Eroded.—The word “eroded” is included in the map unit name.

Excessive permeability.—Saturated hydraulic conductivity is 42 micrometers per second or more within the soil profile.

Flooding.—Flooding is occasional, frequent, or very frequent.

Gullied.—The word “gullied” is included in the map unit name.

High content of organic matter.—The surface layer has more than 20 percent organic matter.

Lime content.—The pH is 7.4 or more in the surface layer, or the wind erodibility group is 4L.

Limited available water capacity.—The available water capacity calculated to a depth of 60 inches or to a root-limiting layer is 6 inches or less.

Limited content of organic matter.—The content of organic matter is 2 percent or less in the surface layer.

Ponding.—Ponding duration is assigned to the map unit component. Water is above the surface.

Potential poor tilth and compaction.—The content of clay is 27 percent or more in the surface layer.

Potential for ground-water contamination (by nutrients or pesticides).—The depth to a seasonal high water table is 4 feet or less, the saturated hydraulic conductivity of any layer is more than 42 micrometers per second, or the depth to bedrock is less than 60 inches.

Potential for surface-water contamination (by nutrients or pesticides).—The map unit component is occasionally, frequently, or very frequently flooded, is subject to ponding, is assigned to hydrologic group C or D and has a slope of more than 2 percent, is assigned to hydrologic group A and has a slope of more than 6 percent, or is assigned to hydrologic group B, has a slope of 3 percent or more, and has a K factor of more than 0.17.

Restricted permeability.—Saturated hydraulic conductivity is less than 0.42 micrometer per second within the soil profile.

Salt content.—The electrical conductivity is 4 or more in the surface layer or 8 or more within a depth of 30 inches.

Seasonal high water table.—The water table is within 2.5 feet of the surface.

Slope (equipment limitation).—The slope is more than 15 percent.

Surface crusting.—The content of clay in the surface layer is 27 percent or more, and the content of organic matter is 2 percent or less.

Surface rock fragments (equipment limitation).—The terms describing the texture of the surface layer include any rock fragment modifier, except for gravelly, channery, stony, very stony, extremely stony, bouldery, very bouldery, and extremely bouldery.

Surface stones (equipment limitation).—The word

“stony” or “bouldery” is included in the description of the surface layer, or at least 0.01 percent of the surface is covered with boulders.

Water erosion.—Either the slope is 6 percent or more, or the slope is more than 3 percent and less than 6 percent and the surface layer is not sandy.

Wind erosion.—The wind erodibility group is 1, 2, 3, or 4L.

Crop Yield Estimates

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Table 6 also shows the corn suitability rating (CSR) for the soils in the survey area. Corn suitability ratings provide a relative ranking of all soils mapped in the State of Iowa based on their potential to be utilized for the intensive production of row crops. The CSR is an index that can be used to rate the potential production of one soil compared with another over a period of time. The CSR considers average weather conditions and frequency of use of the soil for row crops. Ratings range from 100 for soils that have no physical limitations, are on minimal slopes, and can be continuously row cropped to as low as 5 for soils that have severe limitations affecting the production of row crops. The ratings listed in this table assume adequate management, natural weather conditions (no irrigation), artificial drainage where required, and no land leveling or terracing. They also assume that soils in the lower positions on the landscape are not affected by frequent damaging floods. The weighted CSR for a given field can be modified by the occurrence of sandy spots, local deposits, rock and gravel outcrops, field boundaries, and noncrossable drainageways. Even though predicted average yields will change with time, the CSRs are expected to remain relatively constant in relation to one another.

The CSRs in Keokuk County range from 95 for map units 280 (Mahaska silty clay loam, 0 to 2 percent slopes) and 1280 (Mahaska silty clay loam, terrace, 0 to 2 percent slopes) to 5 for several map units, including 313F2 (Gosport silty clay loam, 18 to 25 percent slopes, moderately eroded). No ratings are provided for miscellaneous areas because of the variability of properties and use of these areas.

Inherent subsoil fertility levels, in terms of potential plant-available phosphorus and potassium, also are given in table 6. Soil tests of the tilled layer are used to determine the most profitable rates of fertilizers for various crops. Nutrient levels in the subsurface layers influence crop yields, particularly in the drier seasons when the nutrients in the dry tilled layer become temporarily unavailable to plants. The availability of nutrients in the tilled layer and the subsoil influences the relative uptake from the two zones in the soil profile. Fertilizer recommendations based on soil tests of the tilled layer may be adjusted by the average nutrient levels in the subsoil of each soil series. Fertilizer recommendations are adjusted for subsoil nutrient levels. The ratings given in the table are described as follows:

Subsoil phosphorus.—The amount of plant-available phosphorus in the subsoil expressed in parts per million and based on the weighted average of air-dried soil samples from the subsoil (at a depth of 30 to 42 inches). (The value listed for complexes is the most limiting value of the soils identified in the map unit name.) A rating of very low indicates less than 7.5 ppm; low, 7.5 to 13.0 ppm; medium, 13.0 to 22.5 ppm; and high, more than 22.5 ppm.

Subsoil potassium.—The amount of plant-available potassium in the subsoil expressed in parts per million and based on the weighted average of air-dried soil samples from the subsoil (at a depth of 12 to 24 inches). (The value listed for complexes is the most limiting value of the soils identified in the map unit name.) A rating of very low minus indicates less than 25 ppm; very low plus, 25 to 50 ppm; low, 50 to 79 ppm; medium, 79 to 125 ppm; and high, more than 125 ppm.

Pasture and Hayland Interpretations

Under good management, proper grazing is essential for the production of high-quality forage, stand survival, and erosion control. Proper grazing helps plants to maintain sufficient and generally vigorous top growth during the growing season. Brush control is essential in many areas, and weed control generally is needed. Rotation grazing and renovation also are important management practices.

The average yields per acre that can be expected of the principal pasture and hay crops under a high level of management are shown in table 7. Yield estimates are often provided in animal unit months (AUM), or the amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about forage yields other than those shown in the table.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland or for engineering purposes.

In the capability system, soils generally are grouped at three levels—capability class, subclass, and unit (USDA, 1961). These categories indicate the degree and kinds of limitations affecting mechanized farming systems that produce the more commonly grown field crops, such as corn, small grain, cotton, hay, and field-grown vegetables. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use.

If properly managed, soils in classes 1, 2, 3, and 4 are suitable for the mechanized production of commonly grown field crops and for pasture and woodland. The degree of the soil limitations affecting the production of cultivated crops increases progressively from class 1 to class 4. The limitations can affect levels of production and the risk of permanent soil deterioration caused by erosion and other factors.

Soils in classes 5, 6, and 7 are generally not suited to the mechanized production of commonly grown field crops without special management, but they are suitable for plants that provide a permanent cover, such as grasses and trees (fig. 14). The severity of the soil limitations affecting crops increases progressively from class 5 to class 7.

Areas in class 8 are generally not suitable for crops, pasture, or woodland without a level of management that is impractical. These areas may have potential for other uses, such as recreational facilities and wildlife habitat.

Capability subclasses identify the dominant kind of limitation in the class. They are designated by adding a small letter, *e, w, s,* or *c*, to the class numeral, for example, 2e. The letter *e* shows that the main hazard is the risk of erosion unless a close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness has been partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

There are no subclasses in class 1 because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w, s,* or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use mainly to pasture, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in tables 6 and 7.

Figure 14.—Planting trees or shrubs in small, irregularly shaped areas of soils in capability class 6 or 7 can provide good habitat for wildlife. Nordness-Eleva complex, 25 to 40 percent slopes, which is in capability class 7, is in the wooded area in the background. Zook silty clay, 0 to 2 percent slopes, occasionally flooded, is in the foreground.

Prime Farmland

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, State, and Federal levels, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, feed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. An adequate moisture supply and a sufficiently long growing season are required. Prime farmland soils produce the highest yields with minimal expenditure of energy and economic resources, and farming these soils results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They either are used for food and fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in National forests, National parks, military reservations, and State parks.

Prime farmland soils commonly receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing

season are favorable, and the level of acidity or alkalinity and the content of salts and sodium are acceptable. The soils have few, if any, rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods, and they are not frequently flooded during the growing season or are protected from flooding. Slopes range mainly from 0 to 6 percent.

Soils that have a high water table or are subject to flooding may qualify as prime farmland where these limitations are overcome by drainage measures or flood control. Onsite evaluation is necessary to determine the effectiveness of corrective measures. More information about the criteria for prime farmland can be obtained at the local office of the Natural Resources Conservation Service.

A recent trend in land use has been the conversion of prime farmland to urban and industrial uses. The loss of prime farmland to other uses puts pressure on lands that are less productive than prime farmland.

About 162,922 acres, or nearly 44 percent of the survey area, meets the requirements for prime farmland.

The map units in the survey area that meet the requirements for prime farmland are listed in table 8. This list does not constitute a recommendation for a particular land use. On some soils included in the table, measures that overcome limitations are needed. The need for these measures is indicated in parentheses after the map unit name. The location of each map unit is shown on the detailed soil maps. The soil qualities that affect use and management are described in the section “Detailed Soil Map Units.”

Erosion Factors

Soil erodibility (K) and soil-loss tolerance (T) factors are used in an equation that predicts the amount of soil lost through water erosion in areas of cropland. The procedure for predicting soil loss is useful in guiding the selection of soil and water conservation practices. The erosion factors for the soils in the survey area are listed in table 19.

Soil Erodibility (Kw) Factor

The soil erodibility (Kw) factor indicates the susceptibility of a soil to sheet and rill erosion by water. The soil properties that influence erodibility are those that affect the infiltration rate, the movement of water through the soil, and the water storage capacity of the soil and those that allow the soil to resist dispersion, splashing, abrasion, and the transporting forces of rainfall and runoff. The most important soil properties are the content of silt plus very fine sand, the content of sand coarser than very fine sand, the content of organic matter, soil structure, and permeability.

Fragment-Free Soil Erodibility (Kf) Factor

This is one of the factors used in the Revised Universal Soil Loss Equation (RUSLE). It shows the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Soil-Loss Tolerance (T) Factor

The soil-loss tolerance (T) factor is an estimate of the maximum annual rate of soil erosion that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons of soil loss per acre per year. Ratings of 1 to 5 are used, depending on soil properties and prior erosion. The criteria used in assigning a T factor to a soil include maintenance of an adequate rooting depth for crop production, potential reduction of crop yields, maintenance of water-control structures affected by sedimentation, prevention of gullying, and the value of nutrients lost through erosion.

Wind Erodibility Groups

Wind erodibility is directly related to the percentage of dry, nonerodible surface soil aggregates larger than 0.84 millimeter in diameter. From this percentage, the wind erodibility index (I) factor is determined. This factor is an expression of the stability of the soil aggregates, or the extent to which they are broken down by tillage and the abrasion caused by windblown soil particles. Soils are assigned to wind erodibility groups (WEG) having similar percentages of dry soil aggregates larger than 0.84 millimeter.

The wind erodibility groups and wind erodibility index numbers are listed in table 19.

Additional information about wind erodibility groups and Kw, Kf, T, and I factors can be obtained from local offices of the Natural Resources Conservation Service or the Cooperative Extension Service.

Forestland

Paul J. Tauke, forestry services supervisor, Iowa Department of Natural Resources, helped prepare this section.

The original land survey of Iowa, made from 1832 to 1859, indicated that about 31 percent of Keokuk County, or 116,531 acres, was wooded when the first settlers arrived. The early settlers felled most of this woodland as they cleared the land for crops and pasture (Andreas, 1875).

A 1954 survey indicated that slightly more than 9

percent of the county, or 35,000 acres, was timbered (Davidson, 1961). By 1974, only 4 percent of the forestland in the county, or 15,800 acres, remained. This decrease in forestland acreage has been attributed to the conversion of moderately steep and highly erodible woodland sites to pasture and cropland (Ostrom, 1974).

The trend toward an ever-shrinking forest resource was reversed between 1974 and 1991. A 1991 survey indicated that about 8 percent of the county, or 30,800 acres, was wooded (Branol and Walkowiak, 1991). This dramatic increase in forested acres occurred when lands formerly classified as improved pasture, improved pasture with trees, or woodland pasture were reclassified as woodland. This reclassification occurred because livestock were removed from these areas. Livestock were removed from woodlots because declining cattle markets reduced the overall number of cattle owners in the county, and farmers no longer owned most of the forestland in the county.

Keokuk County land ownership demographics from 1991 show a subtle shift away from traditional farm ownership of timber (Branol and Walkowiak, 1991). Although farmers still held 56 percent of all forestland in the county, the remaining 44 percent was owned by nonfarming individuals (26 percent), corporations (9 percent), and government agencies (9 percent).

The majority of upland timber in Keokuk County is in areas of Lindley, Clinton, Keswick, and Chelsea soils. Most of the bottom-land timber is in areas of Nodaway, Amana, and other soils on flood plains.

The principal upland tree species are white oak, northern red oak, black oak, and shagbark hickory. The principal bottom-land species are eastern cottonwood, silver maple, white oak, and black walnut. Other species that occur, although they are not abundant, are black cherry, river birch, green ash, basswood, and American sycamore. American elm and red elm commonly occur in upland and bottom-land stands; however, individual trees are typically small as a result of mortality caused by Dutch elm disease. Typically, abandoned pastures quickly become occupied by eastern redcedar, honeylocust, and shingle oak.

The suitability of soil types for growing individual tree species varies greatly. As a rule, trees grow best in areas of deep, well drained or moderately well drained soils. If the soil is slowly permeable, root development and tree growth are severely restricted (Countryman and others, 1985). Soils on north- and east-facing slopes are cooler and damper than those in other areas and are well suited to northern red oak and black oak. Soils on ridgetops and on south- and west-facing slopes are warmer and drier and are well suited to white oak and shagbark hickory. Moist, well drained soils on bottom land are excellent sites for black walnut. Cottonwood and silver maple can grow well in areas of somewhat poorly drained soils on bottom land. Green ash generally grows best on bottom-land soils; however, this species also grows well on some upland sites. Eroded areas that support timber are suitable sites for Scotch pine, eastern white pine, and red pine.

Soils that formed under woodland vegetation, prairie vegetation, or cropland are good sites for the planting of hardwood trees.

Since about 1985, tree planting has become an important component of Keokuk County's conservation efforts. Tree plantings of between 10 and 40 acres on highly erodible Conservation Reserve Program land have become common.

More than 90 percent of the trees planted in Keokuk County between 1985 and 1996 were hardwood species, such as white oak, northern red oak, bur oak, swamp white oak, black walnut, green ash, white ash, silver maple, hard maple, Chinese chestnut, and eastern cottonwood. Softwoods, such as white pine, red pine, Scotch pine, Norway spruce, white spruce, and eastern redcedar, make up the remaining percentage of planted seedlings.

In the late 1950s and early 1960s, pine species were heavily promoted and planted in the county. Softwood species were promoted because it was believed that they would be more valuable in the future than native hardwoods. Also, because of poor growth rates and survivability, native hardwood species were not considered to be suitable for planting on cultivated and moderately eroded soils. Both of these beliefs have proven erroneous.

Demand and prices for native hardwood lumber, such as white oak, red oak, black oak, silver maple, green ash, and black walnut, have never been stronger. In contrast, there is little demand for Iowa-grown pine timber. Hardwood plantations have been successful in recent years. This success has proven that the problem of growing native hardwoods on cultivated soils was primarily a function of poor planning, poor implementation, and poor followup. With proper site preparation, planting technique, species selection, and control of grass and weed competition, native hardwood plantings can be extremely successful.

Forestland owners have a tendency to cut only the best individual trees or species from their woodlots. This practice, known as high-grading, results in a residual stand of poor-quality trees. The scientific management of forestland stands, referred to as silviculture, can result in production of an increased

volume of valuable forest products. A well managed timber stand can maximize economic return, reduce the hazard of erosion, improve water quality, provide wildlife habitat, and enhance recreational opportunities.

Proper management of forestland includes protecting the timber from grazing. Grazing by livestock results in sparse, poor-quality stands. Livestock hooves damage the base of trees and allow decay organisms to enter the tree's main stem. The grazing animals browse and trample young seedlings. The results are soil compaction, a reduced rate of water infiltration, an increased runoff rate, and the sedimentation of streams (Branol and Walkowiak, 1991). It is impossible to raise livestock and produce high-quality timber on the same ground.

Other forestland management activities include timber stand improvement (TSI) and timber harvesting. TSI activities involve crop tree release management and weed tree eradication. Crop tree release involves selecting 40 to 50 of the best individual trees in the woodlot and thinning around the selected crop trees. Releasing crop trees increases the amount of sunlight they receive. Increased sunlight allows trees to expand their live crowns, resulting in faster diameter growth, shortened rotation age, and improved forest health. Weed tree eradication involves eliminating all undesirable species down to 1 inch in diameter from the stand. This practice prepares the site for tree planting or stimulates natural regeneration of desired species. Weed tree eradication is commonly carried out in preparation for a timber harvest.

Harvesting of woodlands should only be undertaken after plans for regenerating the timber stand have been made. Regeneration can be accomplished by manipulating the stand to encourage the growth of naturally regenerated tree seedlings or by a combination of stand manipulation and artificial regeneration (planting).

Each woodland or tree planting site presents its own unique set of problems and possible solutions. Professional advice is available from the Iowa Department of Natural Resources district foresters, from Resource Conservation and Development (RC&D) foresters, or from private consulting foresters.

Table 9 can help woodland owners or forestland managers plan the use of soils for wood crops. Only those soils suitable for wood crops are listed.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *volume* number. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that forestland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *volume of wood fiber*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic feet per acre per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

Trees to manage are those that are suitable for commercial wood production.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Windbreaks are often planted on land that did not originally support trees. Knowledge of how trees perform on such land can be gained only by observing and recording the performance of trees that have been planted and have survived. Many popular windbreak species are not indigenous to the areas in which they are planted.

Each tree or shrub species has certain climatic and physiographic limits. Within these parameters, a tree or shrub may grow well or grow poorly, depending on the characteristics of the soil. Each tree or shrub has definable potential heights in a given physiographic area and under a given climate. Accurate definitions of potential heights are necessary when a windbreak is planned and designed.

Table 10 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in this table are based on

measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Natural Resources Conservation Service or the Cooperative Extension Service or from a nursery.

Windbreak Suitability Groups

Windbreak suitability groups consist of soils in which the kinds and degrees of the hazards and limitations that affect the survival and growth of trees and shrubs in windbreaks are about the same. Table 11 lists the windbreak suitability groups of the soils in the survey area.

Group 1 consists of soils that are somewhat poorly drained or moderately well drained, are rapidly permeable to moderately slowly permeable, and do not have free carbonates in the upper 20 inches.

Group 1K consists of soils that are somewhat poorly drained or moderately well drained, are rapidly permeable to moderately slowly permeable, and have free carbonates within 20 inches of the surface. These soils may be very slightly saline or slightly saline (the electrical conductivity is 2 to 8).

Group 2 consists of poorly drained soils that have been artificially drained and do not have free carbonates in the upper 20 inches. Permeability varies.

Group 2K consists of poorly drained or very poorly drained soils that have been artificially drained and have free carbonates within 20 inches of the surface. Permeability varies. These soils may be very slightly saline or slightly saline (the electrical conductivity is 2 to 8).

Group 2H consists of very poorly drained soils that have been artificially drained and have more than 16 inches of organic material. Permeability varies.

Group 2W consists of very poorly drained soils that are subject to ponding and have been artificially drained. It includes soils that have an organic surface layer up to 16 inches thick. Permeability varies.

Group 3 consists of soils that are well drained or moderately well drained and are loamy or silty throughout. Permeability is moderate or moderately slow. These soils do not have free carbonates in the upper 20 inches.

Group 4 consists of soils that are well drained, moderately well drained, or somewhat poorly drained and have a silty or loamy surface layer and a clayey subsoil. Permeability is slow or very slow.

Group 4C consists of soils that are well drained, moderately well drained, or somewhat poorly drained and have a clayey surface layer and subsoil. Permeability is slow or very slow.

Group 4F consists of soils that are well drained, moderately well drained, or somewhat poorly drained and have a substratum of dense till. Permeability is slow or very slow.

Group 5 consists of soils that are excessively drained to moderately well drained and have a moderate available water capacity. These soils are dominantly fine sandy loam or sandy loam, but some are sandy in the upper part and loamy in the lower part.

Group 6G consists of excessively drained to moderately well drained soils that are loamy in the upper part and have sand or sand and gravel at a depth of 20 to 40 inches. These soils have a low or moderate available water capacity.

Group 6D consists of excessively drained to moderately well drained, loamy soils that have bedrock at a depth of 20 to 40 inches. These soils have a low or moderate available water capacity.

Group 7 consists of excessively drained to well drained soils that are dominantly loamy fine sand or coarser textured and are shallow to sand or to sand and gravel. These soils have a low available water capacity.

Group 8 consists of excessively drained to well drained, loamy soils that have free carbonates within 20 inches of the surface.

Group 9W consists of soils that are somewhat poorly drained, poorly drained, or very poorly drained and are moderately saline (the electrical conductivity is 8 to 16).

Group 10 consists of soils or miscellaneous land types that generally are not suitable for windbreaks. One or more characteristics, such as soil depth, texture, wetness, available water capacity, or slope, limit the planting, survival, or growth of trees and shrubs.

Recreation

Two parks and recreation areas provide opportunities for camping, picnicking, and hiking in Keokuk County. Belva Deer County Park and Yenruogis County Park are near Sigourney and are well maintained and managed for these recreational uses.

Several other smaller county parks are managed by the Keokuk County Conservation Board. These are Coffman Park, Griffin Park, Manhattan River Access, Checauqua River Access, and the Delta Covered Bridge Park. These parks provide picnic sites and day use areas. The Delta Covered Bridge Park also

features the oldest covered bridge in the State of Iowa (fig. 15).

Most of the communities in the county have at least one city park. These parks have shelter houses, playground equipment, picnic tables, and ball fields.

The county has several wildlife preserves and nature areas. These include the English River Wildlife Area, Bond Hill Park, South Skunk Wildlife Area, and the Rubio Access Wildlife Area.

Many of the rural areas in the county provide opportunities for hunting and fishing. Many rural residents have established excellent wildlife habitat on their property by planting and managing species of plants that encourage the propagation of wildlife. Many residents have also constructed small ponds on their property and stocked them with fish. Several rivers in Keokuk County also provide fishing and boating opportunities.

The county has a golf course, an archery range, and a gun shooting range.

The soils of the survey area are rated in table 12 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of

Figure 15.—The oldest covered bridge in Iowa is in the Delta Covered Bridge Park. The trees on the flood plain beside the bridge are in an area of Nodaway silt loam, channeled, 0 to 2 percent slopes, frequently flooded.

the height, duration, intensity, and frequency of flooding is essential.

In table 12, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or a combination of these.

The information in table 12 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 15 and interpretations for dwellings without basements and for local roads and streets in table 14.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Chuck Steffen, wildlife biologist, Iowa Department of Natural Resources, helped prepare this section.

Keokuk County supports a variety of wildlife species. These wildlife resources have a positive effect on the local economy by providing opportunities for hunting, fishing, and wildlife observation. Songbirds, hawks, owls, snakes, and other predators provide additional benefits by controlling rodents and undesirable insects.

Both the diversity and the abundance of wildlife in Keokuk County are indirectly affected by soil types through their influence on vegetation and land use. Because of its effect on vegetation and land use, topography also plays a role in determining the types and abundance of wildlife in the county. The nearly level Taintor and Mahaska soils are used for intensive row cropping and provide only limited shelter and nesting areas for wildlife unless special provisions are made, such as leaving brushy or herbaceous fencerows undisturbed, delaying mowing of set-aside and other odd areas, and planting wildlife food or cover plots. The moderately steep and steep areas throughout the county, such as areas of Lindley and Gara soils, are important to wildlife because they are generally less intensively cropped than the more level areas. The diversity and interspersion of woodlands, pastures, brushy ravines, and croplands associated with these steeper soils result in more diverse and abundant wildlife resources.

Pheasant, cottontail rabbit, raccoon, skunk, and opossum are generally abundant in the upland flats and moderately sloping areas of the county. Whitetail deer and bobwhite quail are abundant where the flat uplands break off into moderately sloping and steeper topography in areas of the Clinton-Lindley-Keswick association, which is described under the heading “General Soil Map Units.” Wild turkeys are abundant in the more extensive woodlands associated with the steeper soils, such as Lindley loam, 25 to 40 percent slopes, or in the larger forested tracts along the North Skunk River, South Skunk River, and Skunk River. Mink, muskrat, and some beaver frequent the Skunk River, South English River, and various creeks throughout the county.

The remaining undrained wetland areas along the

Skunk River, South English River, and other streams throughout the county provide habitat for waterfowl and other wetland wildlife. The most common nesting waterfowl species is the wood duck, which nests in hollow trees along the larger streams and along the Skunk River. Old bayous, cutoff channels, and other shallow water areas along these streams provide important brood areas where young wood ducks can find food and protection from predators. A variety of other marsh birds, including herons, egrets, and shorebirds, use these shallow water areas for feeding or nesting. Giant Canada geese nest on many of the larger farm ponds in the county. The Nodaway, Colo, Amana, and Chequest soils on bottom land along the South English River, the North Skunk River, the South Skunk River, and the Skunk River provide sites for dikes and shallow water impoundments, which can improve habitat for waterfowl and other wetland wildlife.

Fish, mainly bullheads and carp, are fairly plentiful in the streams throughout the county. Channel catfish are the major sought-after species in the Skunk River. Many privately owned artificial ponds are well distributed throughout the county. The well managed ponds provide excellent fishing for largemouth bass, bluegill, and channel catfish. Internal drainage, available water capacity, texture of the subsoil, and permeability are important factors affecting the selection of sites for farm ponds and shallow water areas for waterfowl. The lake at Belva Deer County Park provides excellent fishing within a short distance from Sigourney.

Although many areas in the county are suitable as wildlife habitat, many more could be improved or developed. A variety of wildlife would benefit from such practices as wildlife food plots, delayed mowing on waterways, terraces, riparian buffer strips, set-aside areas, pasture rotation systems incorporating warm-season native grasses, and retention of brushy and herbaceous fencerows as travel lanes for wildlife. Small irregularly shaped areas of limited value for other uses could be developed as wildlife habitat by planting trees, shrubs, and native grasses or by merely fencing the area and allowing natural succession to occur. Forestland can be made more productive for timber and wildlife by excluding livestock from the stands. Minimizing or eliminating fall tillage of crop fields can help to prevent erosion and can provide winter food for wildlife. Incorporating islands and other features in the design of new farm ponds and shallow water areas helps to provide safe nesting areas for Canada geese and other waterfowl.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 13, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of grain and seed crops are corn, soybeans, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture also are considerations. Examples of grasses and legumes are bromegrass, timothy, orchardgrass, clover, alfalfa, wheatgrass, and birdsfoot trefoil.

Wild herbaceous plants are native or naturally

established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of wild herbaceous plants are bluestems, indiangrass, blueberry, goldenrod, lambsquarters, dandelions, blackberry, ragweed, wheatgrass, and nightshade.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, box elder, birch, maple, green ash, willow, and American elm. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, cedar, and tamarack.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweeds, wild millet, rushes, sedges, bulrushes, wild rice, arrowhead, waterplantain, cattail, prairie cordgrass, bluejoint grass, asters, and beggarticks.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include Hungarian partridge, ring-necked pheasant, bobwhite quail, sharp-tailed grouse, meadowlark, field sparrow, killdeer, cottontail rabbit, and red fox.

Habitat for woodland wildlife consists of areas of deciduous and/or coniferous plants and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, thrushes, woodpeckers, owls, tree squirrels, porcupine, raccoon, and whitetail deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, bitterns, rails, kingfishers, muskrat, otter, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the data in the tables described under the heading “Soil Properties.”

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about particle-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 7 feet of the surface, soil wetness, depth to a water table, ponding, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility,

permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 14 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, or other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 15 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and

limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

The table also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

The table gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in the table are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, rock fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil

material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 16 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavation and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones or have a water table at a depth of 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent; are wet; or have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 16, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or

soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 17 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A

restricted rooting depth, a severe hazard of wind erosion or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts and sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey.

Soil properties are ascertained by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine particle-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties are shown in tables. They include engineering index properties, physical and chemical properties, and pertinent soil and water features.

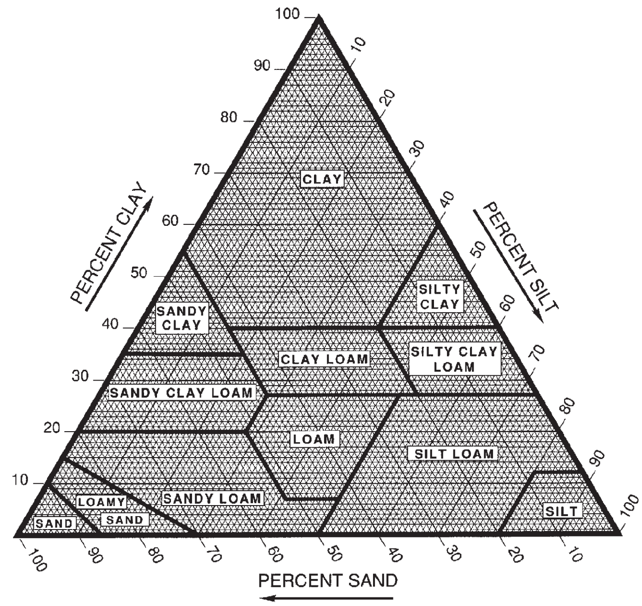

Figure 16.—Percentages of clay, silt, and sand in the basic USDA soil textural classes.

Engineering Index Properties

Table 18 gives the engineering classifications and the range of index properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter (fig. 16). “Loam,” for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, “gravelly.” Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2001) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2000).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and

plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of particle-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is generally omitted in the table.

Physical Properties

Table 19 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In table 19, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $^1/_3$- or $^1/_{10}$-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The term “permeability,” as used in soil surveys, indicates saturated hydraulic conductivity (K_{sat}). The estimates in the table indicate the rate of water movement, in inches per hour, when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod

at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 19, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in table 19 as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are as follows:

1. Coarse sands, sands, fine sands, and very fine sands.
2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, ash material, and sapric soil material.
3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay.
5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material.
6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay.
7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material.
8. Soils that are not subject to wind erosion because of rock fragments on the surface or because of surface wetness.

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Chemical Properties

Table 20 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable bases that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of extractable bases plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil. Incorporating nitrogen fertilizer into calcareous soils helps to prevent nitrite accumulation and ammonium-N volatilization.

Water Features

Table 21 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

Water table refers to a saturated zone in the soil. Table 21 indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. Table 21 indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions

(the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Soil Features

Table 22 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff, 1998 and 1999). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 23 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Mollisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquoll (*Aqu*, meaning water, plus *oll*, from Mollisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Endoaquolls (*Endo*, meaning within, plus *aquolls*, the suborder of the Mollisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. An example is Cumulic Endoaquolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineralogy class, cation-exchange activity class, soil temperature regime, soil depth, and reaction class. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, mixed, superactive, mesic Cumulic Endoaquolls.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the “Soil Survey Manual” (Soil Survey Division Staff, 1993). Many of the technical terms used in the descriptions are defined in “Soil Taxonomy” (Soil Survey Staff, 1999) and in “Keys to Soil Taxonomy” (Soil Survey Staff, 1998). Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

Ackmore Series

Typical Pedon

Ackmore silt loam, 0 to 2 percent slopes, occasionally flooded, 2,300 feet south and 1,000 feet east of the northwest corner of sec. 27, T. 75 N., R. 10 W.; USGS Keota, Iowa, topographic quadrangle; lat. 41 degrees 16 minutes 30 seconds N. and long. 91 degrees 59 minutes 44 seconds W.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine and fine granular structure; friable; few fine roots; few fine tubular pores; neutral; abrupt smooth boundary.

C—6 to 22 inches; stratified very dark gray (10YR 3/1), dark grayish brown (10YR 4/2), and grayish brown (10YR 5/2) silt loam; moderate thick platy structure; friable; few fine roots; few fine tubular pores; few fine prominent dark yellowish brown (10YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; abrupt smooth boundary.

2Ab1—22 to 28 inches; black (10YR 2/1) silty clay loam; weak fine subangular blocky structure parting to moderate fine and medium granular; friable; few fine roots; few fine tubular pores; few fine prominent dark yellowish brown (10YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; gradual smooth boundary.

2Ab2—28 to 40 inches; black (10YR 2/1) silty clay loam; weak fine subangular blocky structure parting to moderate very fine and fine granular; firm; few fine roots; few fine tubular pores; few fine prominent dark yellowish brown (10YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; gradual smooth boundary.

2Ab3—40 to 53 inches; black (10YR 2/1) silty clay loam; moderate very fine and fine subangular blocky structure; firm; few fine roots; few fine tubular pores; few fine prominent dark yellowish brown (10YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; gradual smooth boundary.

2Ab4—53 to 64 inches; dark gray (10YR 4/1) and very dark gray (10YR 3/1) silty clay loam; moderate fine and medium subangular blocky structure; firm; few fine roots; few fine tubular pores; few fine prominent dark yellowish brown (10YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; clear smooth boundary.

3Ab5—64 to 76 inches; black (N 2/0) silty clay; moderate medium subangular blocky structure; very firm; few fine roots; few fine tubular pores; few fine prominent dark yellowish brown (10YR 4/6) redoximorphic concentrations; neutral; gradual smooth boundary.

3Ab6—76 to 80 inches; black (N 2/0) silty clay; moderate medium and coarse subangular blocky structure; very firm; sheen on the surface of peds; few fine prominent dark yellowish brown (10YR 4/6) redoximorphic concentrations; neutral.

Range in Characteristics

Depth to 2Ab horizon: 20 to 36 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

C horizon:
Hue—10YR
Value—2 to 5
Chroma—1 or 2
Texture—silt loam

2Ab horizon:
Hue—N or 10YR
Value—2 to 4
Chroma—0 or 1
Texture—silty clay or silty clay loam

3Ab horizon:
Hue—N or 10YR
Value—2 or 3
Chroma—0 or 1
Texture—silty clay

Adair Series

Taxadjunct feature: The Adair soils in this county do not have a mollic epipedon.

Typical Pedon

Adair clay loam, in an area of Shelby-Adair complex, 9 to 14 percent slopes, moderately eroded, 120 feet south and 2,300 feet west of the northeast corner of sec. 25, T. 77 N., R. 13 W.; USGS What Cheer, Iowa, topographic quadrangle; lat. 41 degrees 27 minutes 09 seconds N. and long. 92 degrees 18 minutes 20 seconds W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) clay loam, dark gray (10YR 4/1) dry; 25 percent streaks and pockets of yellowish red (5YR 4/6) subsoil material; weak very fine and fine granular structure; friable; common fine roots; common fine tubular pores; 1 percent fine mixed pebbles; neutral; abrupt smooth boundary.

2Bt1—8 to 13 inches; yellowish red (5YR 4/6) clay; moderate very fine and fine subangular blocky structure; very firm; few fine roots; few fine tubular pores; many prominent brown (7.5YR 4/4) clay

films on faces of peds; common prominent very dark grayish brown (10YR 3/2) organic coats on faces of peds; common fine prominent red (2.5YR 4/8) redoximorphic concentrations; few fine prominent grayish brown (10YR 5/2) redoximorphic depletions; 2 percent fine mixed pebbles; moderately acid; gradual smooth boundary.

2Bt2—13 to 20 inches; brown (7.5YR 5/4) clay; moderate fine subangular blocky structure; very firm; few fine roots; few fine tubular pores; many prominent brown (7.5YR 4/2) clay films on faces of peds; common fine prominent red (2.5YR 4/8) redoximorphic concentrations; common fine prominent grayish brown (10YR 5/2) redoximorphic depletions; 5 percent fine and medium mixed pebbles; moderately acid; clear smooth boundary.

2Bt3—20 to 33 inches; yellowish brown (10YR 5/6) clay loam; moderate medium and coarse subangular blocky structure; firm; few fine roots; few fine tubular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine distinct strong brown (7.5YR 5/6) and few fine prominent yellowish red (5YR 5/8) redoximorphic concentrations; common fine and medium prominent light brownish gray (10YR 6/2) redoximorphic depletions; few fine irregular masses of iron-manganese; 5 percent fine and medium mixed pebbles; slightly acid; gradual smooth boundary.

2Bt4—33 to 42 inches; yellowish brown (10YR 5/6) clay loam; moderate medium and coarse subangular blocky structure; firm; few fine roots; few fine tubular pores; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine distinct strong brown (7.5YR 5/6) redoximorphic concentrations; common fine prominent light brownish gray (10YR 6/2) redoximorphic depletions; few fine irregular masses of iron-manganese; 5 percent fine and medium mixed pebbles; slightly acid; gradual smooth boundary.

2Bt5—42 to 52 inches; yellowish brown (10YR 5/4) clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few fine tubular pores; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; common medium and coarse prominent light brownish gray (2.5Y 6/2) redoximorphic depletions; few fine irregular masses of iron-manganese; 5 percent fine and medium mixed pebbles; neutral; gradual smooth boundary.

2Bt6—52 to 66 inches; yellowish brown (10YR 5/4) clay loam; weak coarse subangular blocky structure; firm; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; common fine and medium prominent light brownish gray (2.5Y 6/2) redoximorphic depletions; few fine irregular masses of iron-manganese; 5 percent fine and medium mixed pebbles; neutral; gradual smooth boundary.

2C—66 to 80 inches; yellowish brown (10YR 5/4) clay loam; massive; firm; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; common fine and medium prominent light brownish gray (2.5Y 6/2) redoximorphic depletions; few fine irregular masses of iron-manganese; 5 percent fine and medium mixed pebbles; neutral.

Range in Characteristics

Thickness of the solum: 42 to 80 inches
Depth to carbonates: 42 to more than 80 inches
Content of rock fragments: 1 to 10 percent

Ap horizon:
Hue—10YR
Value—3
Chroma—1 or 2
Texture—clay loam

2Bt horizon (upper part):
Hue—2.5YR, 5YR, 7.5YR, or 10YR
Value—3 to 5
Chroma—3 to 6
Texture—clay or clay loam

2Bt horizon (lower part):
Hue—10YR or 7.5YR
Value—4 or 5
Chroma—2 to 6
Texture—clay loam

2BC horizon (if it occurs):
Hue—10YR
Value—4 to 6
Chroma—2 to 6
Texture—clay loam

2C horizon:
Hue—10YR
Value—4 or 5
Chroma—2 to 6
Texture—clay loam

Amana Series

Typical Pedon

Amana silt loam, 0 to 2 percent slopes, occasionally flooded, 1,370 feet west and 1,930 feet south of the northeast corner of sec. 16, T. 77 N., R. 10 W.; USGS South English, Iowa, topographic quadrangle; lat. 41 degrees 28 minutes 38 seconds N. and long. 92 degrees 00 minutes 30 seconds W.

Ap—0 to 9 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine and medium granular structure; friable; common fine roots; common fine tubular pores; neutral; abrupt smooth boundary.

A—9 to 15 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate fine and medium granular structure; friable; few fine roots; few fine tubular pores; neutral; clear smooth boundary.

Bg1—15 to 22 inches; dark grayish brown (10YR 4/2) silty clay loam; weak very fine and fine subangular blocky structure; friable; few fine roots; few fine tubular pores; few distinct very dark gray (10YR 3/1) organic coats on faces of peds; common fine distinct yellowish brown (10YR 5/4) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; clear smooth boundary.

Bg2—22 to 30 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate fine and medium subangular blocky structure; friable; few fine roots; few fine tubular pores; common fine distinct yellowish brown (10YR 5/4) redoximorphic concentrations; common fine distinct light brownish gray (10YR 6/2) redoximorphic depletions; few fine irregular masses of iron-manganese; slightly acid; gradual smooth boundary.

Bg3—30 to 37 inches; grayish brown (10YR 5/2) silty clay loam; weak medium prismatic structure parting to weak medium subangular blocky; friable; few fine roots; few fine tubular pores; few distinct dark grayish brown (10YR 4/2) coats on faces of peds; common fine and medium prominent yellowish brown (10YR 5/6) redoximorphic concentrations; common fine distinct light brownish gray (10YR 6/2) redoximorphic depletions; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

Bg4—37 to 48 inches; grayish brown (10YR 5/2) silt loam; weak medium prismatic structure parting to weak coarse subangular blocky; friable; few fine roots; few fine tubular pores; few distinct dark grayish brown (10YR 4/2) coats in root channels and/or pores; common fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; many fine and medium distinct light brownish gray (10YR 6/2) redoximorphic depletions; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

BCg—48 to 56 inches; grayish brown (10YR 5/2) silt loam; weak medium prismatic structure; friable; few fine roots; few fine tubular pores; few distinct dark grayish brown (10YR 4/2) coats in root channels and/or pores; common fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; many fine and medium distinct light brownish gray (10YR 6/2) redoximorphic depletions; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

Cg1—56 to 76 inches; light brownish gray (10YR 6/2) silt loam; massive; friable; many fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

Cg2—76 to 80 inches; light brownish gray (10YR 6/2) loam; massive; friable; many fine and medium prominent dark yellowish brown (10YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; moderately acid.

Range in Characteristics

Thickness of the solum: 40 to 60 inches
Thickness of the mollic epipedon: 10 to 20 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

Bg horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2
Texture—silt loam or silty clay loam

BCg horizon (if it occurs):
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 to 3
Texture—silt loam

Cg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6

Chroma—1 to 4
Texture—silt loam or loam

Armstrong Series

Typical Pedon

Armstrong clay loam, 9 to 14 percent slopes, moderately eroded, 2,030 feet north and 1,140 feet west of the southeast corner of sec. 12, T. 75 N., R. 10 W.; USGS Keota, Iowa, topographic quadrangle; lat. 41 degrees 18 minutes 53 seconds N. and long. 91 degrees 56 minutes 59 seconds W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) clay loam, grayish brown (10YR 5/2) dry; 25 percent streaks and pockets of brown (10YR 4/3) subsoil material; moderate very fine and fine granular structure; friable; few fine roots; few fine tubular pores; slightly acid; abrupt smooth boundary.

BE—9 to 12 inches; brown (10YR 4/3) clay loam; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; friable; few fine roots; few fine tubular pores; few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few distinct brown (10YR 5/3) silt coats on faces of peds; few fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; strongly acid; gradual smooth boundary.

2Bt1—12 to 17 inches; yellowish red (5YR 4/6) clay; moderate very fine and fine subangular blocky structure; very firm; few fine roots; few fine tubular pores; common distinct brown (7.5YR 4/4) clay films on faces of peds; common fine prominent red (2.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; strongly acid; gradual smooth boundary.

2Bt2—17 to 24 inches; yellowish red (5YR 4/6) clay; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; very firm; few fine roots; few fine tubular pores; common distinct brown (7.5YR 4/4) clay films on faces of peds; many fine prominent red (2.5YR 5/8) redoximorphic concentrations; common fine prominent grayish brown (10YR 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese; strongly acid; gradual smooth boundary.

2Bt3—24 to 35 inches; strong brown (7.5YR 5/6) clay loam; moderate medium prismatic structure parting to moderate medium and coarse subangular blocky; firm; few fine roots; few fine tubular pores; few distinct brown (7.5YR 4/3) clay films on faces of peds; many fine prominent yellowish red (5YR 5/8) redoximorphic concentrations; common fine prominent grayish brown (10YR 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

2Bt4—35 to 43 inches; strong brown (7.5YR 5/6) clay loam; moderate medium prismatic structure; firm; few fine roots; few fine tubular pores; few distinct brown (10YR 4/3) clay films on faces of peds; common fine prominent strong brown (7.5YR 5/8) redoximorphic concentrations; common fine prominent grayish brown (10YR 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese; 10 percent fine and medium mixed pebbles; moderately acid; gradual smooth boundary.

2BC—43 to 54 inches; yellowish brown (10YR 5/4) and pale brown (10YR 6/3) clay loam; weak medium prismatic structure; firm; few fine roots; few fine tubular pores; common fine prominent grayish brown (10YR 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese; 2 percent fine and medium mixed pebbles; neutral; gradual smooth boundary.

2C1—54 to 63 inches; yellowish brown (10YR 5/6) clay loam; massive; firm; common fine prominent grayish brown (10YR 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese; neutral; gradual smooth boundary.

2C2—63 to 80 inches; yellowish brown (10YR 5/6) clay loam; massive; firm; many medium prominent grayish brown (10YR 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese and common medium and coarse irregular carbonate concretions; strongly effervescent; moderately alkaline.

Range in Characteristics

Thickness of the solum: 42 to 80 inches
Depth to carbonates: 42 to 80 inches
Content of rock fragments: 1 to 10 percent

Ap horizon:
Hue—10YR
Value—3
Chroma—1 or 2
Texture—clay loam

BE horizon:
Hue—10YR
Value—4 or 5

Chroma—2 to 4
Texture—clay loam

2Bt horizon:
Hue—7.5YR or 5YR
Value—4 or 5
Chroma—2 to 6
Texture—clay or clay loam

2BC horizon:
Hue—2.5Y or 10YR
Value—4 to 6
Chroma—3 to 6
Texture—clay loam

2C horizon:
Hue—2.5Y or 10YR
Value—4 to 6
Chroma—3 to 6
Texture—clay loam

Ashgrove Series

Typical Pedon

Ashgrove silty clay loam, 9 to 14 percent slopes, moderately eroded, 2,000 feet north and 1,600 feet west of the southeast corner of sec. 20, T. 74 N., R. 11 W.; USGS Pekin, Iowa, topographic quadrangle; lat. 41 degrees 11 minutes 51 seconds N. and long. 92 degrees 08 minutes 45 seconds W.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silty clay loam, light gray (10YR 7/2) dry; 20 percent streaks and pockets of brown (10YR 4/3) subsoil material; moderate very fine subangular blocky structure; friable; common fine roots; common fine vesicular pores; few fine irregular masses of iron-manganese accumulation; 2 percent fine pebbles; slightly acid; abrupt smooth boundary.

2Bt—7 to 13 inches; brown (10YR 4/3) clay; moderate medium subangular blocky structure; firm; common fine roots; common fine tubular pores; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine prominent brown (7.5YR 4/4) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; 2 percent fine pebbles; moderately acid; clear smooth boundary.

2Btg1—13 to 23 inches; gray (10YR 5/1) clay; moderate medium subangular blocky structure; very firm; common fine roots; common fine tubular pores; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; 2 percent fine pebbles; strongly acid; gradual smooth boundary.

2Btg2—23 to 32 inches; gray (10YR 5/1) clay; moderate medium subangular blocky structure; very firm; common fine tubular pores; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; 2 percent fine pebbles; moderately acid; gradual smooth boundary.

2Btg3—32 to 40 inches; gray (10YR 5/1) clay; weak medium subangular blocky structure; very firm; common fine tubular pores; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many medium prominent yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; 2 percent fine pebbles; moderately acid; gradual smooth boundary.

2Btg4—40 to 60 inches; gray (10YR 6/1) clay; weak medium subangular blocky structure; firm; common fine tubular pores; common distinct grayish brown (10YR 5/2) clay films on faces of peds; many medium and coarse prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; 2 percent fine pebbles; slightly acid; gradual smooth boundary.

2Cg—60 to 80 inches; gray (10YR 5/1) clay loam; massive; friable; common fine tubular pores; many coarse prominent strong brown (7.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; 4 percent fine pebbles; neutral.

Range in Characteristics

Thickness of the solum: 42 to 80 inches
Content of rock fragments: 1 to 4 percent

Ap or A horizon:
Hue—10YR
Value—3 or 4
Chroma—1 to 3
Texture—silty clay loam

E horizon (if it occurs):
Hue—10YR
Value—5
Chroma—2 or 3
Texture—silt loam or silty clay loam

2Bt horizon:
Hue—10YR

Value—4 or 5
Chroma—2 to 4
Texture—clay

2Btg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 3
Texture—clay

2Cg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—5
Chroma—1 to 6
Texture—clay loam

Billett Series

Typical Pedon

Billett fine sandy loam, in an area of Billett, loamy substratum-Ladoga, sandy substratum, complex, 5 to 9 percent slopes, 1,960 feet east and 2,340 feet north of the southwest corner of sec. 19, T. 77 N., R. 11 W.; USGS Keswick, Iowa, topographic quadrangle; lat. 41 degrees 27 minutes 35 seconds N. and long. 92 degrees 10 minutes 30 seconds W.

Ap—0 to 8 inches; very dark brown (10YR 2/2) fine sandy loam, dark grayish brown (10YR 4/2) dry; weak very fine and fine granular structure; very friable; few fine roots; few fine vesicular pores; neutral; abrupt smooth boundary.

E—8 to 12 inches; dark grayish brown (10YR 4/2) fine sandy loam, light brownish gray (10YR 6/2) dry; weak thin platy structure; very friable; few fine roots; few fine tubular pores; many distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds and common distinct grayish brown (10YR 5/2) silt coats on faces of peds; neutral; clear smooth boundary.

Bt1—12 to 20 inches; brown (10YR 4/3) fine sandy loam; weak fine and medium subangular blocky structure; very friable; many distinct clay bridges between sand grains; few distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds and common distinct light brownish gray (10YR 6/2) silt coats on faces of peds; slightly acid; clear smooth boundary.

Bt2—20 to 30 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium subangular blocky structure; very friable; common distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; gradual smooth boundary.

2Bt3—30 to 37 inches; dark yellowish brown (10YR 4/4) loam; weak medium subangular blocky structure; friable; few distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; gradual smooth boundary.

2Bt4—37 to 43 inches; dark yellowish brown (10YR 4/4) loam; weak medium subangular blocky structure; friable; few distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

2BC—43 to 57 inches; brown (10YR 5/3) silt loam; weak medium and coarse subangular blocky structure; friable; moderately acid; gradual smooth boundary.

2C—57 to 80 inches; brown (10YR 5/3) loam; massive; friable; moderately acid.

Range in Characteristics

Thickness of the solum: 25 to more than 60 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture—fine sandy loam

E horizon:
Hue—10YR
Value—4 or 5
Chroma—2 to 4
Texture—fine sandy loam

Bt horizon:
Hue—10YR
Value—4 to 6
Chroma—3 to 6
Texture—fine sandy loam or loamy fine sand

2Bt horizon:
Hue—10YR
Value—4 to 6
Chroma—3 to 6
Texture—loam or silt loam

2BC and 2C horizons:
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture—loam or silt loam

Bucknell Series

Typical Pedon

Bucknell silty clay loam, 9 to 14 percent slopes, moderately eroded, 850 feet south and 300 feet west of the northeast corner of sec. 10, T. 75 N., R. 10 W.; USGS Keota, Iowa, topographic quadrangle; lat. 41

degrees 19 minutes 16 seconds N. and long. 91 degrees 59 minutes 03 seconds W.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; 15 percent streaks and pockets of dark grayish brown (10YR 4/2) subsoil material; moderate fine and medium granular structure; friable; few fine roots; few fine tubular pores; neutral; abrupt smooth boundary.

2Btg1—6 to 12 inches; dark grayish brown (10YR 4/2) clay; moderate fine and medium subangular blocky structure; very firm; few fine roots; few fine tubular pores; many distinct dark gray (10YR 4/1) clay films on faces of peds; common fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; 1 percent pebbles; moderately acid; gradual smooth boundary.

2Btg2—12 to 19 inches; dark grayish brown (10YR 4/2) clay; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; firm; few fine roots; few fine tubular pores; common distinct dark gray (10YR 4/1) clay films on faces of peds; many fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; 1 percent pebbles; moderately acid; gradual smooth boundary.

2Btg3—19 to 28 inches; grayish brown (2.5Y 5/2) clay; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few fine tubular pores; common distinct gray (10YR 5/1) clay films on faces of peds; many fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; 1 percent pebbles; moderately acid; gradual smooth boundary.

2Btg4—28 to 38 inches; grayish brown (2.5Y 5/2) clay loam; moderate medium prismatic structure; firm; few fine roots; few fine tubular pores; few distinct gray (10YR 5/1) clay films on faces of peds; many fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; 1 percent pebbles; slightly acid; gradual smooth boundary.

2BCg—38 to 53 inches; grayish brown (2.5Y 5/2) clay loam; weak medium prismatic structure; firm; few fine roots; few fine tubular pores; few distinct gray (10YR 5/1) clay films on faces of peds; many medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; 1 percent pebbles; neutral; gradual smooth boundary.

2Cg1—53 to 62 inches; yellowish brown (10YR 5/4) clay loam; massive; firm; many fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; common medium prominent light brownish gray (2.5Y 6/2) redoximorphic depletions; few fine irregular masses of iron-manganese; 1 percent pebbles; neutral; gradual smooth boundary.

2Cg2—62 to 80 inches; yellowish brown (10YR 5/4) clay loam; massive; firm; many fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; common medium prominent light brownish gray (2.5Y 6/2) redoximorphic depletions; few fine irregular masses of iron-manganese and few fine rounded carbonate concretions; 2 percent pebbles; strongly effervescent; slightly alkaline.

Range in Characteristics

Thickness of the solum: 40 to 60 inches
Content of rock fragments: 1 to 3 percent

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silty clay loam

2Btg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—2 to 8
Texture—clay loam or clay

2BCg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—2 to 8
Texture—clay loam

2Cg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—2 to 8
Texture—clay loam

Cantril Series

Typical Pedon

Cantril loam, 5 to 9 percent slopes, 120 feet south and 175 feet east of the northwest corner of sec. 24, T. 76 N., R. 11 W.; USGS South English, Iowa, topographic quadrangle; lat. 41 degrees 22 minutes 48 seconds N. and long. 92 degrees 04 minutes 59 seconds W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2)

loam, grayish brown (10YR 5/2) dry; weak medium platy structure parting to weak very fine subangular blocky; friable; common fine roots; common fine vesicular pores; neutral; clear smooth boundary.

E—9 to 16 inches; dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; weak thick platy structure parting to weak fine subangular blocky; friable; common fine roots; common fine vesicular pores; common prominent light gray (10YR 7/2) silt coats on faces of peds; few fine irregular masses of iron-manganese accumulation; slightly acid; clear smooth boundary.

BE—16 to 21 inches; dark grayish brown (10YR 4/2) loam, pale brown (10YR 6/3) dry; weak thick platy structure parting to moderate fine subangular blocky; friable; common fine roots; common fine vesicular pores; common prominent light gray (10YR 7/2) silt coats on faces of peds; few fine irregular masses of iron-manganese accumulation; slightly acid; clear smooth boundary.

Btg1—21 to 30 inches; 60 percent brown (10YR 5/3) and 40 percent grayish brown (10YR 5/2) clay loam; weak medium subangular blocky structure parting to moderate fine subangular blocky; friable; common fine roots; common fine tubular pores; common distinct dark brown (10YR 3/3) clay films on faces of peds and in pores and common distinct light brownish gray (10YR 6/2) silt coats on faces of peds; common fine faint yellowish brown (10YR 5/4) and common fine prominent yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; moderately acid; gradual smooth boundary.

Btg2—30 to 39 inches; grayish brown (10YR 5/2) clay loam; weak medium subangular blocky structure parting to moderate fine subangular blocky; friable; common fine roots; common fine tubular pores; common distinct brown (7.5YR 4/2) clay films on faces of peds and in pores and common distinct light brownish gray (10YR 6/2) silt coats on faces of peds; common medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; moderately acid; gradual smooth boundary.

Btg3—39 to 48 inches; grayish brown (10YR 5/2) clay loam; weak medium subangular blocky structure; friable; common fine tubular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; common medium prominent yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; moderately acid; gradual smooth boundary.

Btg4—48 to 58 inches; dark grayish brown (10YR 4/2) clay loam; weak coarse subangular blocky structure; friable; common fine tubular pores; few distinct dark gray (10YR 4/1) clay films on faces of peds and in pores; common fine prominent brown (7.5YR 4/4) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; moderately acid; gradual smooth boundary.

Cg—58 to 80 inches; grayish brown (10YR 5/2) clay loam; massive; friable; common fine tubular pores; common medium prominent strong brown (7.5YR 5/6) and common fine faint brown (10YR 5/3) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly acid.

Range in Characteristics

Thickness of the solum: 42 to 60 inches
Depth to carbonates: 42 to more than 80 inches

Ap horizon:
Hue—10YR
Value—3
Chroma—1 or 2
Texture—loam

E horizon:
Hue—10YR
Value—4 or 5
Chroma—2
Texture—silt loam or loam

BE horizon (if it occurs):
Hue—10YR
Value—4 or 5
Chroma—2
Texture—loam

Btg horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—clay loam

Cg horizon:
Hue—10YR
Value—4 or 5
Chroma—2
Texture—clay loam

Chelsea Series

Typical Pedon

Chelsea loamy fine sand, in an area of Chelsea-Fayette complex, 9 to 14 percent slopes, 2,210 feet north and 2,100 feet east of the southwest corner of sec. 14, T. 75 N., R. 13 W.; USGS Delta, Iowa, topographic quadrangle; lat. 41 degrees 17 minutes 56 seconds N. and long. 92 degrees 19 minutes 41 seconds W.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) loamy fine sand, light brownish gray (10YR 6/2) dry; weak fine granular structure; very friable; common fine roots; few fine tubular pores; moderately acid; gradual smooth boundary.

E1—6 to 10 inches; dark grayish brown (10YR 4/2) loamy fine sand, light brownish gray (10YR 6/2) dry; single grain; very friable; few fine roots; few fine tubular pores; moderately acid; clear smooth boundary.

E2—10 to 21 inches; dark yellowish brown (10YR 4/4) loamy fine sand; single grain; loose; moderately acid; gradual smooth boundary.

E3—21 to 42 inches; yellowish brown (10YR 5/4) loamy fine sand; single grain; loose; moderately acid; gradual smooth boundary.

E and Bt—42 to 80 inches; light yellowish brown (10YR 6/4) sand; single grain; loose; yellowish red (5YR 5/6) bands of loamy sand 1 to 2 inches thick at depths of 53, 62, and 74 inches; moderately acid.

Range in Characteristics

Thickness of the solum: 48 to more than 80 inches
Special features: The sand is dominantly fine sand. Material as coarse as gravel does not occur to a depth of 40 inches or more.

A or Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—1 to 4
Texture—loamy fine sand

E horizon:
Hue—10YR
Value—4 to 6
Chroma—2 to 4
Texture—fine sand or loamy fine sand

E and Bt horizon (E part):
Hue—10YR
Value—4 to 6
Chroma—3 to 6
Texture—fine sand

E and Bt horizon (Bt part):
Total thickness—less than 6 inches in the upper 80 inches of the profile
Hue—7.5YR or 10YR
Value—3 or 4
Chroma—3 or 4
Texture—sandy loam, loamy sand, or sand

Chequest Series

Typical Pedon

Chequest silty clay loam, 0 to 2 percent slopes, occasionally flooded, 220 feet south and 2,040 feet east of the northwest corner of sec. 10, T. 74 N., R. 11 W.; USGS Ollie, Iowa, topographic quadrangle; lat. 41 degrees 14 minutes 04 seconds N. and long. 92 degrees 06 minutes 49 seconds W.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate fine granular structure; friable; common fine roots; common fine vesicular pores; neutral; abrupt smooth boundary.

A—9 to 14 inches; very dark gray (10YR 3/1) silty clay loam; moderate fine angular blocky structure; friable; common fine roots; common fine vesicular pores; neutral; clear smooth boundary.

Btg1—14 to 18 inches; dark gray (10YR 4/1) silty clay loam; moderate very fine and fine subangular blocky structure; friable; common fine roots; common fine vesicular pores; common distinct very dark gray (10YR 3/1) organic coats on faces of peds and common distinct dark grayish brown (10YR 4/2) clay films in root channels and/or pores; few fine prominent yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; neutral; clear smooth boundary.

Btg2—18 to 29 inches; dark gray (10YR 4/1) silty clay loam; moderate fine and medium subangular blocky structure; friable; common fine roots; common fine vesicular pores; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine prominent yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly acid; gradual smooth boundary.

Btg3—29 to 40 inches; gray (5Y 5/1) silty clay loam; moderate medium and coarse subangular blocky structure; friable; common fine roots; common fine vesicular pores; many distinct dark gray (5Y 4/1) clay films on faces of peds; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular

masses of iron-manganese accumulation; slightly acid; gradual smooth boundary.

Btg4—40 to 60 inches; gray (5Y 5/1) silty clay loam; moderate coarse prismatic structure parting to moderate medium and coarse subangular blocky; friable; common fine roots; common fine vesicular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly acid; gradual smooth boundary.

Btg5—60 to 66 inches; gray (5Y 5/1) silty clay loam; weak coarse prismatic structure parting to weak medium and coarse subangular blocky; friable; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly acid; gradual smooth boundary.

C—66 to 80 inches; olive gray (5Y 5/2) silty clay loam; massive; friable; common medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly acid.

Range in Characteristics

Thickness of the solum: 42 to 70 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1
Texture—silty clay loam or silt loam

Btg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1
Texture—silty clay loam or silty clay

Cg horizon:
Hue—7.5YR, 10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 6
Texture—silty clay loam or silty clay

Clarinda Series

Taxadjunct feature: The Clarinda soil in map unit 222C2 does not have a mollic epipedon.

Typical Pedon

Clarinda silty clay loam, 5 to 9 percent slopes, moderately eroded, 360 feet east and 450 feet north of the southwest corner of sec. 26, T. 77 N., R. 12 W.; USGS Keswick, Iowa, topographic quadrangle; lat. 41 degrees 26 minutes 22 seconds N. and long. 92 degrees 13 minutes 07 seconds W.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; 15 percent streaks and pockets of dark gray (10YR 4/1) subsoil material; weak very fine and fine granular structure; friable; common fine roots; common fine tubular pores; slightly alkaline; abrupt smooth boundary.

2Btg1—7 to 14 inches; dark gray (10YR 4/1) clay; moderate fine and medium subangular blocky structure; very firm; few fine roots; few fine tubular pores; common distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds and in pores; many distinct very dark gray (10YR 3/1) organic coats on faces of peds; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; neutral; clear smooth boundary.

2Btg2—14 to 23 inches; gray (10YR 5/1) clay; moderate medium subangular blocky structure; very firm; few fine roots; few fine tubular pores; many distinct dark gray (10YR 4/1) clay films on faces of peds; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; gradual smooth boundary.

2Btg3—23 to 34 inches; gray (10YR 5/1) clay; weak medium prismatic structure parting to moderate medium subangular blocky; very firm; few fine roots; few fine tubular pores; common distinct dark gray (10YR 4/1) clay films on faces of peds; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; gradual smooth boundary.

2Btg4—34 to 45 inches; gray (10YR 5/1) clay; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few fine tubular pores; few distinct dark gray (10YR 4/1) clay films on faces of peds; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine distinct grayish brown (2.5Y 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese; neutral; gradual smooth boundary.

2Btg5—45 to 64 inches; gray (10YR 5/1) clay; weak medium and coarse prismatic structure; friable; few distinct grayish brown (10YR 5/2) clay films on faces of peds; many fine and medium prominent strong brown (7.5YR 5/6) and few fine prominent yellowish red (5YR 4/6) redoximorphic concentrations; few fine prominent grayish brown

(2.5Y 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese; neutral; gradual smooth boundary.

2Cg—64 to 80 inches; yellowish brown (10YR 5/6) clay loam; massive; friable; common fine prominent light brownish gray (10YR 6/2) redoximorphic depletions; 2 percent fine and medium mixed pebbles; few fine irregular masses of iron-manganese; neutral.

Range in Characteristics

Thickness of the solum: 66 to 76 inches
Content of rock fragments: 1 to 3 percent

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1
Texture—silty clay loam

Btg horizon (if it occurs):
Hue—10YR
Value—4
Chroma—1
Texture—silty clay loam

2Btg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—1
Texture—silty clay or clay

2Cg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—1 to 6
Texture—clay loam

Clinton Series

Typical Pedon

Clinton silt loam, 2 to 5 percent slopes, 1,200 feet north and 70 feet west of the southeast corner of sec. 7, T. 74 N., R. 12 W.; USGS Hedrick, Iowa, topographic quadrangle; lat. 41 degrees 13 minutes 24 seconds N. and long. 92 degrees 16 minutes 35 seconds W.

A—0 to 2 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate very fine granular structure; friable; many fine and medium roots; common fine tubular pores; neutral; abrupt smooth boundary.

E1—2 to 5 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate thin platy structure; friable; many fine to coarse roots; few fine tubular pores; very few distinct dark yellowish brown (10YR 4/4) organic coats in root channels and/or pores and very few faint very dark gray (10YR 3/1) organic coats on faces of peds; slightly acid; clear smooth boundary.

E2—5 to 10 inches; brown (10YR 4/3) silt loam, light gray (10YR 7/1) dry; weak medium subangular blocky structure parting to moderate thin platy; friable; many fine to coarse roots; many fine tubular pores; very few distinct very dark gray (10YR 3/1) organic coats on faces of peds; few fine irregular masses of iron-manganese; slightly acid; clear smooth boundary.

E3—10 to 15 inches; brown (10YR 4/3) silt loam, light gray (10YR 7/1) dry; weak fine subangular blocky structure; friable; many fine to coarse roots; common fine tubular pores; common distinct grayish brown (10YR 5/2) silt coats on faces of peds; few fine irregular masses of iron-manganese; moderately acid; clear smooth boundary.

Bt1—15 to 20 inches; dark yellowish brown (10YR 4/4) silty clay loam; strong fine subangular blocky structure; friable; few fine roots; few fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds and few distinct grayish brown (10YR 5/2) silt coats in root channels and/or pores; few fine irregular masses of iron-manganese; very strongly acid; gradual smooth boundary.

Bt2—20 to 27 inches; dark yellowish brown (10YR 4/4) silty clay loam; strong fine subangular blocky structure; firm; few fine roots; few fine tubular pores; some clay fillings in pores; common distinct brown (10YR 4/3) clay films on faces of peds and few distinct grayish brown (10YR 5/2) silt coats in root channels and/or pores; few fine irregular masses of iron-manganese; very strongly acid; gradual smooth boundary.

Bt3—27 to 39 inches; brown (10YR 5/3) silty clay loam; weak medium prismatic structure parting to strong medium subangular blocky; firm; few fine roots; few fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds and few distinct grayish brown (10YR 5/2) silt coats on horizontal faces of peds; few fine irregular masses of iron-manganese; very strongly acid; diffuse smooth boundary.

Bt4—39 to 47 inches; brown (10YR 5/3) silty clay loam; weak medium prismatic structure parting to strong medium angular blocky; friable; few fine roots; few fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds and

very few distinct grayish brown (10YR 5/2) silt coats on vertical faces of peds; few fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine distinct grayish brown (2.5Y 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese; very strongly acid; diffuse smooth boundary.

Bt5—47 to 58 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; many fine tubular pores; few distinct brown (10YR 4/3) clay films on faces of peds; few fine distinct strong brown (7.5YR 5/6) redoximorphic concentrations; few fine distinct olive gray (5Y 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese; moderately acid; diffuse smooth boundary.

BC—58 to 72 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium prismatic structure; friable; few fine roots; many fine tubular pores; few distinct brown (10YR 4/3) clay films on faces of peds; few fine distinct strong brown (7.5YR 5/6) redoximorphic concentrations; few fine distinct olive gray (5Y 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese; moderately acid; diffuse smooth boundary.

C—72 to 80 inches; yellowish brown (10YR 5/4) silty clay loam; massive; friable; few fine roots; many fine and medium tubular pores; few fine distinct yellowish brown (10YR 5/8) redoximorphic concentrations; few fine distinct olive gray (5Y 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese; moderately acid.

Range in Characteristics

Thickness of the solum: 42 to more than 80 inches

A or Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—1 to 3
Texture—silt loam or silty clay loam

E horizon (if it occurs):
Hue—10YR
Value—4 or 5
Chroma—2 to 4
Texture—silt loam

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silty clay loam or silty clay

BC and C horizons:
Hue—10YR
Value—5
Chroma—3 or 4
Texture—silty clay loam

Colo Series

Typical Pedon

Colo silty clay loam, 0 to 2 percent slopes, occasionally flooded, 2,040 feet south and 1,390 feet west of the northeast corner of sec. 6, T. 77 N., R. 13 W.; USGS Barnes City, Iowa, topographic quadrangle; lat. 41 degrees 30 minutes 16 seconds N. and long. 92 degrees 23 minutes 54 seconds W.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate fine and medium granular structure; friable; few fine roots throughout; few fine tubular pores; neutral; abrupt smooth boundary.

A1—8 to 16 inches; black (N 2/0) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine and medium granular structure; friable; few fine roots throughout; few fine tubular pores; neutral; gradual smooth boundary.

A2—16 to 36 inches; black (N 2/0) silty clay loam, very dark gray (10YR 3/1) dry; moderate very fine and fine subangular blocky structure; firm; few fine roots throughout; few fine tubular pores; common medium rounded dark concretions; neutral; gradual smooth boundary.

BA—36 to 42 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine and medium subangular blocky structure; firm; few fine roots throughout; few fine tubular pores; neutral; gradual smooth boundary.

Bg—42 to 49 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate fine and medium subangular blocky structure; firm; few fine roots throughout; few fine tubular pores; 35 percent clay; 2 percent sand; neutral; clear wavy boundary.

BCg—49 to 59 inches; gray (10YR 5/1) silty clay loam; moderate medium subangular blocky structure; friable; very few distinct very dark grayish brown (10YR 3/2) organic coats in root channels and/or pores; common fine faint grayish brown (10YR 5/2) redoximorphic depletions; neutral; gradual wavy boundary.

Cg—59 to 80 inches; olive gray (5Y 5/2) silty clay loam; massive; friable; very few distinct very dark

grayish brown (10YR 3/2) organic coats in root channels and/or pores; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; common medium prominent dark gray (10YR 4/1) redoximorphic depletions; few medium rounded dark concretions; neutral.

Range in Characteristics

Thickness of the solum: 36 to 60 inches
Thickness of the mollic epipedon: More than 36 inches

Ap and A horizons:
Hue—10YR or N
Value—2 or 3
Chroma—0 or 1
Texture—silty clay loam or silt loam

BA and Bg horizons:
Hue—10YR, 2.5Y, 5Y, or N
Value—2 or 3
Chroma—0 or 1
Texture—silty clay loam

BCg and Cg horizons:
Hue—10YR, 2.5Y, or 5Y
Value—3 to 5
Chroma—1 or 2
Texture—silty clay loam

Coppock Series

Typical Pedon

Coppock silt loam, 2 to 5 percent slopes, rarely flooded, 2,050 feet south and 1,530 feet east of the northwest corner of sec. 22, T. 74 N., R. 10 W.; USGS Richland, Iowa, topographic quadrangle; lat. 41 degrees 12 minutes 07 seconds N. and long. 91 degrees 59 minutes 47 seconds W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak very fine and fine granular structure; friable; common fine roots; common fine vesicular pores; few fine irregular masses of iron-manganese accumulation; neutral; abrupt smooth boundary.

E1—8 to 15 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; strong medium platy structure; friable; few fine roots; few fine vesicular pores; many distinct pale brown (10YR 6/3) silt coats on faces of peds and very few distinct very dark grayish brown (10YR 3/2) organic coats in root channels and/or pores; few fine irregular masses of iron-manganese accumulation; neutral; clear smooth boundary.

E2—15 to 20 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate medium platy structure parting to weak fine subangular blocky; friable; few fine roots; few fine vesicular pores; common distinct pale brown (10YR 6/3) silt coats on faces of peds; few fine irregular masses of iron-manganese accumulation; slightly acid; clear smooth boundary.

E3—20 to 25 inches; dark gray (10YR 4/1) silt loam, gray (10YR 6/1) dry; weak very thick platy structure parting to moderate medium subangular blocky; friable; few fine roots; few fine vesicular pores; few distinct pale brown (10YR 6/3) silt coats on faces of peds; few fine irregular masses of iron-manganese accumulation; moderately acid; gradual smooth boundary.

Btg1—25 to 32 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few fine vesicular pores; common distinct dark gray (10YR 4/1) clay films on faces of peds; common fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; moderately acid; gradual smooth boundary.

Btg2—32 to 45 inches; light brownish gray (2.5Y 6/2) silty clay loam; moderate medium prismatic structure parting to weak medium subangular blocky; friable; few fine roots; few fine vesicular pores; few distinct gray (10YR 5/1) clay films on faces of peds; many fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly acid; gradual smooth boundary.

BCg—45 to 57 inches; light brownish gray (2.5Y 6/2) silty clay loam; weak coarse prismatic structure; friable; many medium and coarse prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly acid; gradual smooth boundary.

Cg—57 to 80 inches; light brownish gray (2.5Y 6/2) silty clay loam; massive; friable; many fine and medium prominent yellowish brown (10YR 5/6) and common medium and coarse prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; neutral.

Range in Characteristics

Thickness of the solum: 40 to 70 inches

Ap horizon:
Hue—10YR

Value—3
Chroma—1 or 2
Texture—silt loam

E horizon:
Hue—10YR
Value—4 to 6
Chroma—1 or 2
Texture—silt loam

BE horizon (if it occurs):
Hue—10YR
Value—4 to 6
Chroma—1 or 2
Texture—silt loam or silty clay loam

Btg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 or 2
Texture—silty clay loam

BCg and Cg horizons:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture—silty clay loam

Douds Series

Typical Pedon

Douds loam, in an area of Galland-Douds complex, 9 to 14 percent slopes, moderately eroded, 900 feet east and 1,200 feet north of the southwest corner of sec. 13, T. 74 N., R. 10 W.; USGS Richland, Iowa, topographic quadrangle; lat. 41 degrees 12 minutes 35 seconds N. and long. 91 degrees 57 minutes 38 seconds W.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) loam, light brownish gray (10YR 6/2) dry; moderate very fine and fine granular structure; friable; common fine roots; common fine vesicular pores; 25 percent streaks and pockets of brown (10YR 4/3) material from the EB horizon; slightly acid; abrupt smooth boundary.

EB—7 to 14 inches; brown (10YR 4/3) loam, pale brown (10YR 6/3) dry; moderate thick platy structure parting to moderate fine subangular blocky; friable; common fine roots; common fine vesicular pores; 40 percent mixings of dark yellowish brown (10YR 4/4) subsoil material; many distinct brown (10YR 5/3) silt coats on faces of peds; moderately acid; clear smooth boundary.

Bt1—14 to 20 inches; dark yellowish brown (10YR 4/4) loam; moderate fine subangular blocky structure; friable; few fine roots; few fine vesicular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; moderately acid; clear smooth boundary.

Bt2—20 to 27 inches; dark yellowish brown (10YR 4/4) loam; moderate fine and medium subangular blocky structure; friable; few fine roots; few fine vesicular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) redoximorphic concentrations; moderately acid; gradual smooth boundary.

Bt3—27 to 34 inches; dark yellowish brown (10YR 4/4) loam; moderate fine and medium subangular blocky structure; friable; few fine roots; few fine vesicular pores; common distinct brown (10YR 4/3) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) redoximorphic concentrations; moderately acid; gradual smooth boundary.

Bt4—34 to 42 inches; dark yellowish brown (10YR 4/4) loam; moderate fine subangular blocky structure; friable; few fine roots; few fine vesicular pores; common distinct brown (10YR 4/3) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) and common fine faint brown (10YR 5/3) redoximorphic concentrations; moderately acid; gradual smooth boundary.

Bt5—42 to 56 inches; yellowish brown (10YR 5/4) sandy clay loam; weak medium subangular blocky structure; friable; few fine roots; few fine vesicular pores; few distinct brown (10YR 4/3) clay films on faces of peds; few fine distinct yellowish brown (10YR 5/6) and common fine faint brown (10YR 5/3) redoximorphic concentrations; moderately acid; gradual smooth boundary.

BC—56 to 68 inches; yellowish brown (10YR 5/4) sandy clay loam; weak coarse subangular blocky structure; friable; few fine roots; few fine vesicular pores; common fine and medium faint pale brown (10YR 6/3) and common fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; moderately acid; gradual smooth boundary.

C—68 to 80 inches; yellowish brown (10YR 5/6) and pale brown (10YR 6/3) sandy loam; massive; friable; common fine and medium prominent yellowish red (5YR 5/6) redoximorphic concentrations; moderately acid.

Range in Characteristics

Thickness of the solum: 36 to 72 inches

Ap horizon:
Hue—10YR

Value—3 to 5
Chroma—1 to 3
Texture—loam

EB horizon (if it occurs):
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—silt loam or loam

Bt horizon:
Hue—10YR or 7.5YR
Value—4 or 5
Chroma—4 to 8
Texture—loam, clay loam, sandy loam, or sandy clay loam

BC and C horizons:
Hue—10YR or 7.5YR
Value—4 to 6
Chroma—2 to 8
Texture—loam, clay loam, sandy clay loam, sandy loam, or loamy sand

Dunbarton Series

Typical Pedon

Dunbarton silt loam, 14 to 18 percent slopes, 2,470 feet north and 1,300 feet east of the southwest corner of sec. 8, T. 75 N., R. 13 W.; USGS Rose Hill, Iowa, topographic quadrangle; lat. 41 degrees 18 minutes 53 seconds N. and long. 92 degrees 23 minutes 17 seconds W.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; few fine roots; few fine tubular pores; moderately acid; abrupt smooth boundary.

2Bt1—7 to 12 inches; yellowish red (5YR 5/6) clay; moderate fine and medium subangular blocky structure; firm; few fine roots; few fine tubular pores; common distinct reddish brown (5YR 4/4) clay films on faces of peds; few fine irregular masses of iron-manganese; moderately acid; clear smooth boundary.

2Bt2—12 to 16 inches; yellowish red (5YR 4/6) clay; moderate medium and coarse subangular blocky structure; very firm; few fine roots; few fine tubular pores; many distinct reddish brown (5YR 4/4) clay films on faces of peds; common fine distinct red (2.5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; clear irregular boundary.

2R—16 inches; hard limestone bedrock.

Range in Characteristics

Thickness of the solum: 12 to 20 inches
Depth to bedrock: 12 to 20 inches
Content of rock fragments: 0 to 20 percent

A horizon:
Hue—10YR or 7.5YR
Value—3 to 5
Chroma—2 to 4
Texture—silt loam

BE or Bt horizon (if it occurs):
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silt loam or silty clay loam

2Bt horizon:
Hue—10YR, 7.5YR, or 5YR
Value—4 or 5
Chroma—3 to 6
Texture—silty clay loam, clay loam, or clay

Eleva Series

Typical Pedon

Eleva sandy loam, in an area of Nordness-Eleva complex, 25 to 40 percent slopes, 1,950 feet north and 1,000 feet west of the southeast corner of sec. 10, T. 74 N., R. 12 W.; USGS Pekin, Iowa, topographic quadrangle; lat. 41 degrees 13 minutes 32 seconds N. and long. 92 degrees 13 minutes 19 seconds W.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) sandy loam, grayish brown (10YR 5/2) dry; weak very fine and fine granular structure; very friable; common fine and medium roots; common distinct very dark gray (10YR 3/1) organic coats on faces of peds; moderately acid; clear smooth boundary.

E—4 to 7 inches; brown (10YR 4/3) sandy loam, pale brown (10YR 6/3) dry; weak thick platy structure; very friable; common fine roots; common distinct dark grayish brown (10YR 4/2) organic coats on faces of peds; slightly acid; clear wavy boundary.

Bt—7 to 17 inches; brown (7.5YR 4/4) loam; weak medium subangular blocky structure; friable; few medium roots; common distinct brown (10YR 4/3) clay films on faces of peds; 2 percent angular

sandstone channers; slightly acid; clear smooth boundary.

BC—17 to 24 inches; yellowish brown (10YR 5/4) and light yellowish brown (10YR 6/4) loamy sand; weak coarse subangular blocky structure; very friable; few fine roots; slightly effervescent; 30 percent angular sandstone channers; slightly alkaline; clear broken boundary.

2Cr—24 to 36 inches; light yellowish brown (10YR 6/4), weakly cemented sandstone bedrock.

2R—36 inches; light yellowish brown (10YR 6/4), strongly cemented sandstone bedrock.

Range in Characteristics

Thickness of the solum: 20 to 40 inches
Depth to bedrock: 20 to 40 inches
Content of rock fragments: 0 to 35 percent

A horizon:
Hue—10YR or 7.5YR
Value—2 to 5
Chroma—1 to 4
Texture—sandy loam

E horizon (if it occurs):
Hue—10YR or 7.5YR
Value—4 or 5
Chroma—2 to 4
Texture—sandy loam, fine sandy loam, or loam

Bt horizon:
Hue—10YR or 7.5YR
Value—4 or 5
Chroma—3 to 6
Texture—loam, sandy loam, or fine sandy loam

BC horizon (if it occurs):
Hue—10YR or 7.5YR
Value—4 to 7
Chroma—4 to 6
Texture—loamy sand, sandy loam, fine sandy loam, loamy fine sand, fine sand, or sand

Ely Series

Typical Pedon

Ely silty clay loam, 2 to 5 percent slopes, 320 feet south and 1,120 feet west of the northeast corner of sec. 20, T. 77 N., R. 12 W.; USGS What Cheer, Iowa, topographic quadrangle; lat. 41 degrees 27 minutes 58 seconds N. and long. 92 degrees 15 minutes 47 seconds W.

Ap—0 to 8 inches; very dark brown (10YR 2/2) silty clay loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; few fine roots; few fine vesicular pores; neutral; abrupt smooth boundary.

A1—8 to 15 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; few fine roots; few fine vesicular pores; neutral; clear smooth boundary.

A2—15 to 24 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; few fine roots; few fine vesicular pores; neutral; clear smooth boundary.

BA—24 to 32 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate very fine and fine subangular blocky structure; friable; few fine roots; few fine vesicular pores; few fine faint dark grayish brown (10YR 4/2) redoximorphic depletions; few fine distinct dark yellowish brown (10YR 4/4) redoximorphic concentrations; neutral; gradual smooth boundary.

Bg1—32 to 39 inches; dark grayish brown (10YR 4/2) silty clay loam; weak medium prismatic structure parting to weak fine and medium subangular blocky; friable; few fine roots; few fine vesicular pores; common dark gray (10YR 4/1) faces of peds caused by distinct coats of silt and very fine sand; common distinct dark brown (10YR 3/3) organic coats on faces of peds; few fine distinct yellowish brown (10YR 5/4) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly acid; gradual smooth boundary.

Bg2—39 to 47 inches; brown (10YR 4/3) silty clay loam; weak medium prismatic structure parting to weak medium subangular blocky; friable; few fine roots; few fine vesicular pores; common gray (10YR 5/1) faces of peds caused by thin distinct coats of silt and very fine sand; common fine faint dark yellowish brown (10YR 4/4), common fine distinct yellowish brown (10YR 5/4), and few fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly acid; gradual smooth boundary.

BCg—47 to 58 inches; grayish brown (10YR 5/2) silty clay loam; weak medium prismatic structure parting to weak medium subangular blocky; friable; few fine roots; few fine vesicular pores; few fine faint gray (10YR 5/1) redoximorphic depletions; common fine distinct yellowish brown (10YR 5/4) and common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations;

few fine irregular masses of iron-manganese accumulation; slightly acid; gradual smooth boundary.

Cg—58 to 80 inches; gray (10YR 5/1) and brown (10YR 5/3) silty clay loam; massive; friable; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly acid.

Range in Characteristics

Thickness of the solum: 40 to 70 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silty clay loam

BA horizon (if it occurs):
Hue—10YR
Value—3
Chroma—1 or 2
Texture—silty clay loam

Bg horizon (upper part):
Hue—10YR
Value—4 or 5
Chroma—2
Texture—silty clay loam

Bg horizon (lower part):
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture—silty clay loam

BCg horizon (if it occurs):
Hue—10YR
Value—4 or 5
Chroma—1 to 3
Texture—silt loam, silty clay loam, loam, or clay loam

Cg horizon:
Hue—10YR
Value—4 or 5
Chroma—1 to 3
Texture—silt loam, silty clay loam, loam, or clay loam

Fayette Series

Typical Pedon

Fayette silt loam, 18 to 25 percent slopes, 1,600 feet south and 640 feet west of the northeast corner of sec. 10, T. 74 N., R. 11 W.; USGS Ollie, Iowa, topographic quadrangle; lat. 41 degrees 13 minutes 52 seconds N. and long. 92 degrees 06 minutes 14 seconds W.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate very fine and fine granular structure; friable; common fine roots throughout; common fine vesicular pores; slightly acid; abrupt smooth boundary.

EB—6 to 10 inches; dark grayish brown (10YR 4/2) and dark yellowish brown (10YR 4/4) silt loam, light brownish gray (10YR 6/2) and light yellowish brown (10YR 6/4) dry; moderate medium platy structure parting to moderate fine subangular blocky; friable; common fine roots throughout; common fine vesicular pores; slightly acid; clear smooth boundary.

Bt1—10 to 16 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate very fine and fine subangular blocky structure; friable; common fine roots throughout; common fine vesicular pores; few distinct brown (10YR 5/3) clay films on faces of peds; common prominent white (10YR 8/2) (dry) silt coats on faces of peds; few fine irregular masses of iron-manganese accumulation; slightly acid; gradual smooth boundary.

Bt2—16 to 21 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; common fine roots throughout; common fine vesicular pores; common distinct brown (10YR 5/3) clay films on faces of peds; common prominent white (10YR 8/2) (dry) silt coats on faces of peds; few fine irregular masses of iron-manganese accumulation; slightly acid; gradual smooth boundary.

Bt3—21 to 33 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; common fine roots throughout; common fine vesicular pores; few distinct brown (10YR 4/3) clay films on faces of peds; common prominent white (10YR 8/2) (dry) silt coats on faces of peds; few fine irregular masses of iron-manganese accumulation; moderately acid; gradual smooth boundary.

Bt4—33 to 44 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium and coarse prismatic structure parting to weak coarse subangular blocky; friable; common fine roots throughout; common fine vesicular pores; very few distinct brown (10YR 4/3) clay films on faces of peds; common prominent white (10YR 8/2) (dry) silt coats on faces of peds; few fine irregular masses

of iron-manganese accumulation; moderately acid; gradual smooth boundary.

BC—44 to 54 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium and coarse prismatic structure; friable; common fine roots throughout; common fine vesicular pores; common prominent white (10YR 8/2) (dry) silt coats on faces of peds; few fine irregular masses of iron-manganese accumulation; moderately acid; gradual smooth boundary.

C1—54 to 72 inches; yellowish brown (10YR 5/4) silt loam; massive; very friable; common fine roots throughout; common fine vesicular pores; many medium faint yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly acid; gradual smooth boundary.

C2—72 to 80 inches; yellowish brown (10YR 5/4) silt loam; massive; very friable; common fine roots throughout; common fine vesicular pores; many medium faint yellowish brown (10YR 5/6) redoximorphic concentrations and few fine prominent grayish brown (10YR 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese accumulation; neutral.

Range in Characteristics

Thickness of the solum: 36 to 80 inches

Ap or A horizon:
Hue—10YR
Value—3 or 4
Chroma—1 to 3
Texture—silt loam

E or EB horizon (if it occurs):
Hue—10YR
Value—4 or 5
Chroma—1 to 4
Texture—silt loam

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture—silty clay loam

BC and C horizons:
Hue—10YR
Value—4 or 5
Chroma—4 to 6
Texture—silt loam or silty clay loam

Galland Series

Typical Pedon

Galland loam, in an area of Galland-Douds complex, 9 to 14 percent slopes, moderately eroded, 1,250 feet north and 920 feet east of the southwest corner of sec. 13, T. 74 N., R. 10 W.; USGS Richland, Iowa, topographic quadrangle; lat. 41 degrees 12 minutes 36 seconds N. and long. 91 degrees 57 minutes 38 seconds W.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) loam, pale brown (10YR 6/3) dry; moderate very fine and fine granular structure; friable; common fine roots throughout; common fine vesicular pores; 10 percent streaks and pockets of brown (10YR 5/3) subsoil material; moderately acid; abrupt smooth boundary.

Bt1—6 to 12 inches; brown (10YR 5/3) clay loam; moderate very fine and fine subangular blocky structure; friable; common fine roots throughout; common fine vesicular pores; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds and in pores and few distinct light brownish gray (10YR 6/2) silt coats on faces of peds; few fine faint grayish brown (10YR 5/2) redoximorphic depletions; moderately acid; clear smooth boundary.

Bt2—12 to 22 inches; brown (7.5YR 5/4) clay loam; moderate very fine and fine subangular blocky structure; friable; common fine roots throughout; common fine vesicular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine prominent grayish brown (10YR 5/2) redoximorphic depletions; common fine prominent yellowish brown (10YR 5/6) redoximorphic concentrations; moderately acid; clear smooth boundary.

Bt3—22 to 31 inches; strong brown (7.5YR 5/6) clay loam; weak fine and medium subangular blocky structure; friable; common fine roots throughout; common fine vesicular pores; common distinct brown (7.5YR 4/2) clay films on faces of peds; common fine prominent grayish brown (10YR 5/2) redoximorphic depletions; common fine distinct yellowish red (5YR 5/6) redoximorphic concentrations; moderately acid; gradual smooth boundary.

Bt4—31 to 47 inches; yellowish red (5YR 5/6) sandy clay loam; weak medium and coarse subangular blocky structure; friable; common fine roots throughout; common fine vesicular pores; few

distinct brown (7.5YR 4/4) clay films on faces of peds; common fine prominent light brownish gray (10YR 6/2) redoximorphic depletions; common fine distinct strong brown (7.5YR 5/6) redoximorphic concentrations; moderately acid; gradual smooth boundary.

BC—47 to 55 inches; strong brown (7.5YR 5/6) sandy loam; weak coarse subangular blocky structure; very friable; few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine and medium prominent yellowish red (5YR 5/8) redoximorphic concentrations; common fine prominent light brownish gray (10YR 6/2) redoximorphic depletions; strongly acid; gradual smooth boundary.

C—55 to 80 inches; strong brown (7.5YR 5/6) sandy loam; massive; very friable; common fine and medium prominent yellowish red (5YR 5/8) redoximorphic concentrations; common fine and medium prominent light brownish gray (10YR 6/2) redoximorphic depletions; moderately acid.

Range in Characteristics

Thickness of the solum: 36 to 72 inches

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—loam

E horizon (if it occurs):
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—2 or 3
Texture—loam or clay loam

Bt horizon:
Hue—10YR, 7.5YR, or 5YR
Value—3 to 5
Chroma—2 to 6
Texture—sandy clay loam, clay loam, clay, or silty clay

BC and C horizons:
Hue—7.5YR, 10YR, or 2.5Y
Value—4 to 6
Chroma—2 to 8
Texture—sandy loam, loam, or clay loam

Gara Series

Typical Pedon

Gara loam, 14 to 18 percent slopes, 2,220 feet north and 1,180 feet west of the southeast corner of sec. 12, T. 75 N., R. 10 W.; USGS Keota, Iowa, topographic quadrangle; lat. 41 degrees 18 minutes 55 seconds N. and long. 91 degrees 56 minutes 59 seconds W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; 15 percent streaks and pockets of brown (10YR 5/3) material from the subsurface layer; moderate very fine and fine granular structure; friable; few fine roots; few fine tubular pores; neutral; abrupt smooth boundary.

E—8 to 13 inches; brown (10YR 5/3) loam; moderate thick platy structure; friable; few fine roots; few fine tubular pores; few fine prominent strong brown (7.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; strongly acid; clear smooth boundary.

BE—13 to 18 inches; yellowish brown (10YR 5/4) clay loam; weak thick platy structure parting to moderate fine subangular blocky; friable; few fine roots; few fine tubular pores; few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds and common distinct brown (10YR 5/3) silt coats on faces of peds; few fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; strongly acid; gradual smooth boundary.

Bt1—18 to 29 inches; yellowish brown (10YR 5/4) clay loam; moderate fine and medium subangular blocky structure; firm; few fine roots; few fine tubular pores; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds and few distinct brown (10YR 5/3) silt coats on faces of peds; common fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; 1 percent fine and medium mixed pebbles; strongly acid; gradual smooth boundary.

Bt2—29 to 39 inches; yellowish brown (10YR 5/4) clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds; common fine prominent strong brown (7.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; 1 percent fine and medium mixed pebbles; moderately acid; gradual smooth boundary.

Bt3—39 to 53 inches; yellowish brown (10YR 5/4) clay loam; moderate medium prismatic structure parting to moderate coarse subangular blocky; firm; few fine roots; few fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds; many fine prominent strong brown

(7.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; 2 percent fine and medium mixed pebbles; moderately acid; gradual smooth boundary.

BC—53 to 69 inches; yellowish brown (10YR 5/6) clay loam; weak coarse prismatic structure; firm; few fine roots; few fine tubular pores; many fine and medium prominent light brownish gray (2.5Y 6/2) redoximorphic depletions; few fine irregular masses of iron-manganese; 2 percent fine and medium mixed pebbles; neutral; clear smooth boundary.

C—69 to 80 inches; yellowish brown (10YR 5/6) clay loam; massive; firm; many fine and medium prominent light brownish gray (2.5Y 6/2) redoximorphic depletions; few fine irregular masses of iron-manganese and common fine and medium rounded carbonate concretions; 2 percent fine and medium mixed pebbles; strongly effervescent; slightly alkaline.

Range in Characteristics

Thickness of the solum: 30 to 70 inches
Depth to carbonates: 30 to 80 inches
Content of rock fragments: 0 to 5 percent fine and medium pebbles below a depth of 7 inches

Ap horizon:
Hue—10YR
Value—3
Chroma—1 or 2
Texture—loam or clay loam

E horizon (if it occurs):
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—loam

BE horizon (if it occurs):
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—loam or clay loam

Bt horizon:
Hue—10YR or 7.5YR
Value—4 or 5
Chroma—3 to 6
Texture—clay loam

BC and C horizons:
Hue—10YR
Value—4 or 5
Chroma—4 to 6
Texture—clay loam

Givin Series

Typical Pedon

Givin silt loam, 0 to 2 percent slopes, 395 feet west and 1,525 feet south of the center of sec. 24, T. 76 N., R. 11 W.; USGS Harper, Iowa, topographic quadrangle; lat. 41 degrees 22 minutes 09 seconds N. and long. 92 degrees 04 minutes 32 seconds W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak coarse subangular blocky structure parting to weak fine granular; friable; few fine roots; few fine tubular pores; slightly acid; abrupt smooth boundary.

E—8 to 12 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak thick platy structure parting to moderate thin platy; friable; few fine roots; few fine tubular pores; moderately acid; clear smooth boundary.

BE—12 to 16 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; few fine tubular pores; common distinct light brownish gray (10YR 6/2) (dry) silt coats on faces of peds and common distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

Bt—16 to 23 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure parting to moderate fine angular blocky; friable; few fine roots; few fine tubular pores; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine faint yellowish brown (10YR 5/4) redoximorphic concentrations; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

Btg1—23 to 34 inches; grayish brown (10YR 5/2) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few fine tubular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine prominent yellowish brown (10YR 5/6) and common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

Btg2—34 to 42 inches; grayish brown (2.5Y 5/2) silty clay loam; weak medium prismatic structure parting to weak coarse angular blocky; friable; few fine roots; few fine tubular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces

of peds; common fine prominent yellowish brown (10YR 5/6) and common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

BCg—42 to 50 inches; grayish brown (2.5Y 5/2) silty clay loam; weak medium and coarse prismatic structure; friable; few fine roots; few fine tubular pores; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many medium prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; slightly acid; gradual smooth boundary.

Cg1—50 to 65 inches; grayish brown (2.5Y 5/2) silty clay loam; massive; friable; few fine roots; few fine tubular pores; many medium prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; slightly acid; gradual smooth boundary.

Cg2—65 to 80 inches; light brownish gray (2.5Y 6/2) silty clay loam; massive; friable; many medium prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; slightly acid.

Range in Characteristics

Thickness of the solum: 40 to 72 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

E horizon:
Hue—10YR
Value—4 or 5
Chroma—2
Texture—silt loam

BE horizon:
Hue—10YR
Value—4 or 5
Chroma—2
Texture—silty clay loam

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3
Texture—silty clay loam or silty clay

Btg horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2
Texture—silty clay loam or silty clay

BCg horizon:
Hue—2.5Y or 5Y
Value—4 or 5
Chroma—2
Texture—silty clay loam

Cg horizon:
Hue—2.5Y or 5Y
Value—4 to 6
Chroma—2
Texture—silty clay loam

Gosport Series

Typical Pedon

Gosport silty clay loam, 18 to 25 percent slopes, moderately eroded, 1,170 feet east and 150 feet south of the northwest corner of sec. 30, T. 75 N., R. 12 W.; USGS Delta, Iowa, topographic quadrangle; lat. 41 degrees 16 minutes 43 seconds N. and long. 92 degrees 17 minutes 32 seconds W.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silty clay loam, light brownish gray (10YR 6/2) dry; 20 percent streaks and pockets of brown (10YR 5/3) subsoil material; weak very fine and fine granular structure; friable; common fine roots throughout; common fine tubular pores; many distinct very dark grayish brown (10YR 3/2) (moist) organic coats on faces of peds; moderately acid; abrupt smooth boundary.

2Bw1—6 to 10 inches; brown (10YR 5/3) silty clay loam; weak very fine and fine subangular blocky structure; firm; common fine roots throughout; common fine tubular pores; common fine faint dark grayish brown (10YR 4/2) mottles; few fine distinct yellowish brown (10YR 5/6) mottles; very strongly acid; gradual smooth boundary.

2Bw2—10 to 15 inches; brown (10YR 5/3) silty clay; moderate fine and medium subangular blocky structure; very firm; common medium faint grayish brown (10YR 5/2) mottles; common fine distinct yellowish brown (10YR 5/6) mottles; extremely acid; gradual smooth boundary.

2Bw3—15 to 22 inches; brown (10YR 5/3) silty clay; weak medium subangular blocky structure; very firm; common medium faint grayish brown (10YR 5/2) mottles; common fine distinct yellowish brown

(10YR 5/6) mottles; extremely acid; gradual smooth boundary.

2Cr—22 to 80 inches; gray (5Y 5/1), strong brown (7.5YR 5/6), grayish brown (2.5Y 5/2), olive brown (2.5Y 4/4), black (N 2/0), and gray (N 5/0), clayey shale.

Range in Characteristics

Thickness of the solum: 20 to 40 inches

Ap or A horizon:
Hue—10YR
Value—3 or 4
Chroma—1 or 2
Texture—silty clay loam

E horizon (if it occurs):
Hue—10YR
Value—4 or 5
Chroma—2 to 4
Texture—silt loam

2Bw horizon:
Hue—10YR, 2.5YR, or 5Y
Value—5 or 6
Chroma—3 or 4
Texture—silty clay or clay

2Cr horizon:
Hue—7.5YR, 10YR, 2.5Y, 5Y, or N
Value—4 to 6
Chroma—0 to 8

Hedrick Series

Typical Pedon

Hedrick silty clay loam, 5 to 9 percent slopes, moderately eroded, 465 feet west and 100 feet south of the northeast corner of sec. 10, T. 75 N., R. 10 W.; USGS Keota, Iowa, topographic quadrangle; lat. 41 degrees 19 minutes 24 seconds N. and long. 91 degrees 59 minutes 05 seconds W.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; 15 percent streaks and pockets of brown (10YR 4/3) subsoil material; weak very fine and fine granular structure; friable; few fine roots; few fine tubular pores; neutral; abrupt smooth boundary.

Bt1—7 to 13 inches; brown (10YR 4/3) silty clay loam; moderate very fine and fine subangular blocky structure; friable; few fine roots; few fine tubular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds and common distinct brown (10YR 5/3) silt coats on faces of peds and in pores; few fine irregular masses of iron-manganese; neutral; clear smooth boundary.

Bt2—13 to 23 inches; grayish brown (10YR 5/2) silty clay loam; strong fine and medium subangular blocky structure; firm; few fine roots; few fine tubular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds and few distinct brown (10YR 5/3) silt coats on faces of peds and in pores; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; strongly acid; gradual smooth boundary.

Bt3—23 to 36 inches; light brownish gray (2.5Y 6/2) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few fine tubular pores; common distinct dark gray (10YR 4/1) clay films on faces of peds; common fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; strongly acid; gradual smooth boundary.

Bt4—36 to 48 inches; light brownish gray (2.5Y 6/2) silty clay loam; moderate medium prismatic structure parting to moderate coarse subangular blocky; firm; few fine roots; few fine tubular pores; few distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; common fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

BC—48 to 60 inches; grayish brown (2.5Y 5/2) and yellowish brown (10YR 5/4) silty clay loam; weak medium prismatic structure; firm; few fine roots; few fine tubular pores; common fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; slightly acid; gradual smooth boundary.

C—60 to 69 inches; grayish brown (2.5Y 5/2) silty clay loam; massive; firm; few fine roots; few fine tubular pores; many fine and medium prominent yellowish brown (10YR 5/6) and few fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; slightly acid; clear smooth boundary.

2Ab—69 to 77 inches; grayish brown (2.5Y 5/2) clay loam; weak medium subangular blocky structure parting to moderate medium granular; firm; many medium prominent yellowish brown (10YR 5/4) redoximorphic concentrations; few medium distinct gray (5Y 5/1) redoximorphic depletions; few fine

irregular masses of iron-manganese; neutral; gradual smooth boundary.

2Btgb—77 to 80 inches; dark grayish brown (2.5Y 4/2) silty clay; moderate fine and medium subangular blocky structure; firm; common distinct gray (5Y 5/1) clay films on faces of peds; few fine prominent yellowish brown (10YR 5/4) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral.

Range in Characteristics

Thickness of the solum: 46 to 70 inches

Ap horizon:
Hue—10YR
Value—3
Chroma—1 or 2
Texture—silty clay loam

Bt horizon (upper part):
Hue—7.5YR, 10YR, or 2.5Y
Value—4 to 6
Chroma—1 to 6
Texture—silty clay loam

Bt horizon (lower part):
Hue—2.5Y or 5Y
Value—5 or 6
Chroma—1 or 2
Texture—silty clay loam or silt loam

BC and C horizons:
Hue—10YR, 2.5Y, or 5Y
Value—5 or 6
Chroma—1 or 2
Texture—silty clay loam or silt loam

2Ab horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—1 or 2
Texture—clay loam

2Btgb horizon:
Hue—2.5Y or 5Y
Value—4 or 5
Chroma—1 or 2
Texture—silty clay or clay

Inton Series

Typical Pedon

Inton silty clay loam, 9 to 14 percent slopes, moderately eroded, 800 feet south and 300 feet west of the northeast corner of sec. 19, T. 74 N., R. 11 W.; USGS Pekin, Iowa, topographic quadrangle; lat. 41 degrees 12 minutes 15 seconds N. and long. 92 degrees 09 minutes 40 seconds W.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate fine subangular blocky structure; friable; common fine roots; common fine vesicular pores; 20 percent streaks and pockets of brown (10YR 4/3) subsoil material; slightly acid; clear smooth boundary.

Bt1—7 to 12 inches; brown (10YR 4/3) silty clay loam; moderate very fine subangular blocky structure; friable; common fine roots; common fine vesicular pores; common prominent grayish brown (10YR 5/2) silt coats on faces of peds and common distinct clay films in root channels and/or pores; strongly acid; clear smooth boundary.

Bt2—12 to 20 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate fine subangular blocky structure; firm; common fine roots; common fine vesicular pores; few distinct light brownish gray (10YR 6/2) silt coats on faces of peds and many distinct dark grayish brown (10YR 4/2) clay films in root channels and/or pores; common fine prominent yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; moderately acid; clear smooth boundary.

Bt3—20 to 27 inches; mottled grayish brown (2.5Y 5/2) and gray (5Y 5/1) silty clay loam; moderate medium subangular blocky structure; firm; common fine roots; common fine vesicular pores; common distinct dark brown (7.5YR 3/2) clay films on faces of peds; many medium prominent yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; moderately acid; gradual smooth boundary.

Bt4—27 to 35 inches; mottled grayish brown (10YR 5/2) and dark grayish brown (2.5Y 4/2) silty clay loam; moderate medium and coarse subangular blocky structure; firm; common fine roots; common fine vesicular pores; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many medium prominent yellowish brown (10YR 5/4) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; moderately acid; gradual smooth boundary.

Bt5—35 to 48 inches; mottled grayish brown (2.5Y 5/2) and dark grayish brown (2.5Y 4/2) silty clay loam; weak coarse subangular blocky structure; friable; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many medium prominent yellowish brown (10YR 5/4) redoximorphic concentrations; few fine irregular masses of iron-

manganese accumulation; moderately acid; gradual smooth boundary.

2Bg1—48 to 68 inches; dark gray (5Y 4/1) clay loam; weak coarse subangular blocky structure; friable; many medium prominent strong brown (7.5YR 5/6) and common fine prominent reddish brown (5YR 4/4) redoximorphic concentrations; common fine prominent light brownish gray (10YR 6/2) redoximorphic depletions; few fine irregular masses of iron-manganese accumulation; moderately acid; gradual smooth boundary.

2Bg2—68 to 80 inches; olive gray (5Y 5/2) clay loam; weak coarse subangular blocky structure; friable; many medium prominent strong brown (7.5YR 5/6) and common fine prominent reddish brown (5YR 4/4) redoximorphic concentrations; common fine prominent light brownish gray (10YR 6/2) redoximorphic depletions; few fine irregular masses of iron-manganese accumulation; slightly acid.

Range in Characteristics

Thickness of the solum: 30 to more than 80 inches

Ap horizon:
Hue—10YR
Value—4
Chroma—2 or 3
Texture—silty clay loam

E horizon (if it occurs):
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—silt loam

Bt horizon (upper part):
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silty clay loam

Bt horizon (lower part):
Hue—2.5Y or 5Y
Value—4 to 6
Chroma—1 or 2
Texture—silty clay loam

BC and C horizons (if they occur):
Hue—2.5Y or 5Y
Value—4 to 6
Chroma—1 or 2
Texture—silt loam or silty clay loam

2Bg horizon:
Hue—5Y
Value—4 or 5
Chroma—1 or 2
Texture—clay loam, silty clay, or clay

Judson Series

Typical Pedon

Judson silty clay loam, 5 to 9 percent slopes, 250 feet west and 1,560 feet north of the center of sec. 11, T. 77 N., R. 10 W.; USGS Kinross, Iowa, topographic quadrangle; lat. 41 degrees 29 minutes 39 seconds N. and long. 91 degrees 58 minutes 32 seconds W.

Ap—0 to 8 inches; very dark brown (10YR 2/2) silty clay loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; few fine roots throughout; few fine tubular pores; moderately acid; abrupt smooth boundary.

A—8 to 20 inches; very dark brown (10YR 2/2) silty clay loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; few fine roots throughout; few fine tubular pores; few fine irregular masses of iron-manganese accumulation; neutral; clear smooth boundary.

AB—20 to 25 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; weak very fine and fine subangular blocky structure; friable; few fine roots throughout; few fine tubular pores; few fine irregular masses of iron-manganese accumulation; neutral; clear smooth boundary.

Bw1—25 to 32 inches; brown (10YR 4/3) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots throughout; few fine tubular pores; very few distinct very dark grayish brown (10YR 3/2) organic coats in root channels and/or pores; few fine irregular masses of iron-manganese accumulation; slightly acid; gradual smooth boundary.

Bw2—32 to 42 inches; brown (10YR 4/3) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots throughout; few fine tubular pores; very few distinct very dark grayish brown (10YR 3/2) organic coats in root channels and/or pores; few fine irregular masses of iron-manganese accumulation; slightly acid; gradual smooth boundary.

Bw3—42 to 58 inches; brown (10YR 4/3) silty clay loam; moderate medium and coarse subangular blocky structure; friable; few fine roots throughout; few fine tubular pores; few fine faint grayish brown (10YR 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese accumulation; neutral; gradual smooth boundary.

BC—58 to 70 inches; yellowish brown (10YR 5/4) silty clay loam; weak coarse subangular blocky structure; friable; common fine distinct grayish brown (10YR 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese accumulation; moderately acid; gradual smooth boundary.

C—70 to 80 inches; yellowish brown (10YR 5/4) silty clay loam; massive; friable; common fine distinct grayish brown (10YR 5/2) redoximorphic depletions; few fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly acid.

Range in Characteristics

Thickness of the solum: 40 to 70 inches

Ap and A horizons:
Hue—10YR
Value—2
Chroma—1 or 2
Texture—silty clay loam

AB horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—2
Texture—silty clay loam

Bw horizon:
Hue—10YR
Value—3 or 4
Chroma—3 or 4
Texture—silty clay loam

BC and C horizons:
Hue—10YR
Value—3 to 5
Chroma—3 or 4
Texture—silty clay loam or silt loam

Kalona Series

Typical Pedon

Kalona silty clay loam, 0 to 2 percent slopes, 1,900 feet east and 1,900 feet north of the southwest corner of sec. 35, T. 76 N., R. 10 W.; USGS What Cheer, Iowa, topographic quadrangle; lat. 41 degrees 20 minutes 32 seconds N. and long. 91 degrees 58 minutes 42 seconds W.

Ap—0 to 8 inches; black (N 2/0) silty clay loam, very dark gray (N 3/0) dry; weak fine and medium granular structure; firm; few fine roots throughout; few fine vesicular pores; neutral; abrupt smooth boundary.

A1—8 to 14 inches; black (N 2/0) silty clay loam, very dark gray (N 3/0) dry; moderate fine and medium subangular blocky structure parting to weak fine granular; firm; few fine roots throughout; few fine vesicular pores; neutral; clear smooth boundary.

A2—14 to 20 inches; black (N 2/0) silty clay loam, very dark gray (N 3/0) dry; moderate fine and medium subangular blocky structure; firm; few fine roots throughout; few fine vesicular pores; neutral; clear smooth boundary.

BA—20 to 24 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate medium subangular blocky structure; firm; few fine roots throughout; few fine vesicular pores; common fine distinct dark grayish brown (10YR 4/2) redoximorphic depletions; neutral; clear smooth boundary.

Bg1—24 to 33 inches; dark gray (5Y 4/1) silty clay; moderate medium subangular blocky structure; firm; few fine roots throughout; few fine vesicular pores; few distinct very dark gray (10YR 3/1) organic coats on faces of peds; many fine distinct dark grayish brown (2.5Y 4/2) redoximorphic depletions; common fine prominent brown (7.5YR 4/4) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; neutral; clear smooth boundary.

Bg2—33 to 42 inches; dark gray (5Y 4/1) silty clay loam; moderate medium and coarse subangular blocky structure; firm; few fine roots throughout; few fine vesicular pores; few distinct very dark gray (10YR 3/1) organic coats on faces of peds; many fine prominent dark grayish brown (2.5Y 4/2) redoximorphic depletions; common fine prominent brown (7.5YR 4/4) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; neutral; clear smooth boundary.

Bg3—42 to 51 inches; olive gray (5Y 5/2) silty clay loam; weak coarse subangular blocky structure; friable; few fine roots throughout; few fine vesicular pores; very few distinct very dark gray (10YR 3/1) organic coats in root channels and/or pores; common medium and coarse prominent strong brown (7.5YR 4/6) and common fine prominent strong brown (7.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; neutral; gradual smooth boundary.

BCg—51 to 61 inches; olive gray (5Y 5/2) silty clay loam; weak coarse subangular blocky structure; friable; very few distinct very dark gray (10YR 3/1)

organic coats in root channels and/or pores; common medium prominent strong brown (7.5YR 4/6) and common medium prominent strong brown (7.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly alkaline; gradual smooth boundary.

Cg1—61 to 70 inches; olive gray (5Y 5/2) silty clay loam; massive; friable; very few distinct dark gray (10YR 4/1) organic coats in root channels and/or pores; many medium and coarse prominent strong brown (7.5YR 4/6) and yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation and common fine irregular masses of lime and few fine irregular carbonate nodules; strongly effervescent on faces of peds and in pores; moderately alkaline; gradual smooth boundary.

Cg2—70 to 80 inches; olive gray (5Y 5/2) silty clay loam; massive; friable; many medium and coarse prominent strong brown (7.5YR 4/6) and yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation, few fine irregular masses of lime, and common medium irregular carbonate nodules; slightly effervescent on faces of peds and in pores; moderately alkaline.

Range in Characteristics

Thickness of the solum: 40 to 72 inches

Ap and A horizons:
Hue—10YR or N
Value—2
Chroma—0 or 1
Texture—silty clay loam

BA horizon (if it occurs):
Hue—10YR
Value—2 or 3
Chroma—1
Texture—silty clay loam or silty clay

Bg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—1 or 2
Texture—silty clay loam or silty clay

BCg and Cg horizons:
Hue—5Y
Value—4 or 5
Chroma—1 or 2
Texture—silt loam or silty clay loam

Keomah Series

Typical Pedon

Keomah silt loam, 0 to 2 percent slopes, 1,395 feet west and 110 feet north of the center of sec. 17, T. 74 N., R. 12 W.; USGS Hedrick, Iowa, topographic quadrangle; lat. 41 degrees 12 minutes 46 seconds N. and long. 92 degrees 16 minutes 17 seconds W.

Ap—0 to 7 inches; dark gray (10YR 4/1) silt loam, gray (10YR 6/1) dry; weak very fine and fine granular structure; friable; common fine roots; common fine tubular pores; many distinct very dark gray (10YR 3/1) organic coats on faces of peds; few fine irregular masses of iron-manganese; neutral; abrupt smooth boundary.

E—7 to 12 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; moderate thick platy structure; friable; few fine roots; few fine tubular pores; common distinct pale brown (10YR 6/3) silt coats on faces of peds; few fine distinct yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; slightly acid; clear smooth boundary.

BE—12 to 14 inches; grayish brown (10YR 5/2) silty clay loam; weak thick platy structure parting to moderate very fine subangular blocky; friable; few fine roots; few fine tubular pores; many distinct pale brown (10YR 6/3) silt coats on faces of peds; few fine distinct yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; moderately acid; clear smooth boundary.

Bt1—14 to 19 inches; brown (10YR 5/3) silty clay loam; strong very fine and fine subangular blocky structure; firm; few fine roots; few fine tubular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; many distinct pale brown (10YR 6/3) silt coats on faces of peds; common fine distinct yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; moderately acid; clear smooth boundary.

Bt2—19 to 25 inches; brown (10YR 5/3) silty clay; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few fine tubular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; common fine distinct yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

Bt3—25 to 36 inches; brown (10YR 5/3) silty clay loam; moderate medium prismatic structure parting to moderate medium and coarse subangular blocky; firm; few fine roots; few fine tubular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; common fine and medium distinct yellowish brown (10YR 5/6) redoximorphic concentrations; common fine faint grayish brown (10YR 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

Bt4—36 to 49 inches; grayish brown (10YR 5/2) silty clay loam; moderate medium prismatic structure parting to moderate coarse subangular blocky; firm; few fine roots; few fine tubular pores; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; many fine and medium prominent yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

Bt5—49 to 59 inches; grayish brown (10YR 5/2) silty clay loam; moderate medium prismatic structure; friable; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; many fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; slightly acid; gradual smooth boundary.

BC—59 to 72 inches; grayish brown (10YR 5/2) silty clay loam; weak medium prismatic structure; friable; many fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; slightly acid; gradual smooth boundary.

C—72 to 80 inches; grayish brown (10YR 5/2) silty clay loam; massive; friable; many fine and medium prominent yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; slightly acid.

Range in Characteristics

Thickness of the solum: 40 to 76 inches

Ap horizon:
Hue—10YR
Value—4
Chroma—1 or 2
Texture—silt loam

E horizon:
Hue—10YR
Value—4 or 5
Chroma—1 to 3
Texture—silt loam

BE horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—silty clay loam

Bt horizon (upper part):
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silty clay or silty clay loam

Bt horizon (lower part):
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—2 or 3
Texture—silty clay loam

BC horizon (if it occurs):
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—2 to 4
Texture—silty clay loam or silt loam

C horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—2 to 4
Texture—silty clay loam or silt loam

Keswick Series

Typical Pedon

Keswick loam, 9 to 14 percent slopes, 550 feet south and 1,780 feet east of the northwest corner of sec. 17, T. 76 N., R. 11 W.; USGS Keswick, Iowa, topographic quadrangle; lat. 41 degrees 23 minutes 36 seconds N. and long. 92 degrees 09 minutes 14 seconds W.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) loam, light brownish gray (10YR 6/2) dry; 5 percent mixings of brown (10YR 5/3) material from the subsurface layer; weak very fine and fine granular structure; friable; common fine roots; common fine tubular pores; many distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds; 1 percent fine mixed pebbles; neutral; abrupt smooth boundary.

EB—5 to 9 inches; brown (10YR 5/3) loam; 20 percent mixings of brown (7.5YR 4/4) subsoil material; weak thick platy structure parting to moderate fine subangular blocky; friable; few fine roots; few fine

tubular pores; few distinct brown (7.5YR 4/2) clay films on faces of peds; common distinct brown (10YR 5/3) silt coats on faces of peds and in pores; very few prominent dark gray (10YR 4/1) organic coats in root channels and/or pores; 1 percent fine mixed pebbles; slightly acid; clear smooth boundary.

2Bt1—9 to 18 inches; yellowish red (5YR 5/6) clay; strong very fine and fine subangular blocky structure; very firm; few fine roots; few fine tubular pores; many prominent brown (7.5YR 4/4) clay films on faces of peds; common prominent dark grayish brown (10YR 4/2) organic coats in pores and root channels; many fine prominent red (2.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; 3 percent fine and medium mixed pebbles; moderately acid; gradual smooth boundary.

2Bt2—18 to 29 inches; strong brown (7.5YR 5/6) clay; moderate fine and medium subangular blocky structure; very firm; few fine roots; few fine tubular pores; common prominent brown (7.5YR 4/4) clay films on faces of peds; many fine prominent red (2.5YR 5/8) redoximorphic concentrations; common fine prominent grayish brown (10YR 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese; 3 percent fine and medium mixed pebbles; strongly acid; clear smooth boundary.

2Bt3—29 to 36 inches; strong brown (7.5YR 5/6) clay loam; moderate medium and coarse subangular blocky structure; firm; few fine roots; few fine tubular pores; common prominent brown (7.5YR 4/2) clay films on faces of peds; common fine prominent grayish brown (10YR 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese; 3 percent fine and medium mixed pebbles; moderately acid; gradual smooth boundary.

2Bt4—36 to 48 inches; yellowish brown (10YR 5/6) clay loam; moderate medium prismatic structure parting to moderate medium and coarse subangular blocky; firm; few fine roots; few fine tubular pores; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine distinct strong brown (7.5YR 5/6) redoximorphic concentrations; common fine and medium prominent light brownish gray (10YR 6/2) redoximorphic depletions; few fine irregular masses of iron-manganese; 3 percent fine and medium mixed pebbles; moderately acid; gradual smooth boundary.

2BC—48 to 65 inches; yellowish brown (10YR 5/6) clay loam; weak medium prismatic structure; friable; common fine prominent yellowish red (5YR 5/8) redoximorphic concentrations; common fine prominent light brownish gray (10YR 6/2) redoximorphic depletions; few fine irregular masses of iron-manganese; 3 percent fine and medium mixed pebbles; neutral; gradual smooth boundary.

2C—65 to 80 inches; yellowish brown (10YR 5/6) clay loam; massive; friable; common fine prominent light brownish gray (10YR 6/2) redoximorphic depletions; few fine irregular masses of iron-manganese; 3 percent fine and medium mixed pebbles; neutral.

Range in Characteristics

Thickness of the solum: 42 to 75 inches
Depth to the 2Bt horizon: 8 to 17 inches
Content of rock fragments: 1 to 3 percent

Ap horizon:
Hue—10YR
Value—4
Chroma—2
Texture—loam or clay loam

E horizon (if it occurs):
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—loam, silt loam, or clay loam

EB horizon (if it occurs):
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 or 4
Texture—loam or clay loam

2Bt horizon (upper part):
Hue—5YR or 7.5YR
Value—4 or 5
Chroma—3 to 6
Texture—clay

2Bt horizon (lower part):
Hue—7.5YR, 10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—1 to 6
Texture—clay loam

2BC horizon:
Hue—10YR, 7.5YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—1 to 6
Texture—clay loam

2C horizon:
Hue—10YR, 7.5YR, 2.5Y, or 5Y

Value—4 or 5
Chroma—1 to 6
Texture—clay loam

Klum Series

Typical Pedon

Klum loam, in an area of Nodaway-Klum complex, 0 to 2 percent slopes, frequently flooded, 1,500 feet west and 2,160 feet north of the southeast corner of sec. 6, T. 74 N., R. 11 W.; USGS Pekin, Iowa, topographic quadrangle; lat. 41 degrees 14 minutes 29 seconds N. and long. 92 degrees 09 minutes 52 seconds W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak fine granular structure; very friable; common fine roots throughout; common fine vesicular pores; 10 percent mixings from plowing of grayish brown (10YR 5/2) very fine sandy loam material; neutral; abrupt smooth boundary.

C1—8 to 20 inches; stratified yellowish brown (10YR 5/4) and grayish brown (10YR 5/2) very fine sandy loam; single grain; loose; few distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds; slightly acid; clear smooth boundary.

C2—20 to 80 inches; stratified dark grayish brown (10YR 4/2), grayish brown (10YR 5/2), brown (10YR 5/3), and yellowish brown (10YR 5/4) very fine sandy loam and loamy fine sand; single grain; loose; $^{1}/_{2}$-inch strata of dark grayish brown (2.5Y 4/2) and grayish brown (2.5Y 5/2) loam at depths of 25 inches, 38 inches, 54 inches, 59 inches, and 79 inches; neutral.

Range in Characteristics

Thickness of the solum: 6 to 10 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—2 or 3
Texture—loam

C horizon:
Hue—7.5YR, 10YR, or 2.5Y
Value—3 to 5
Chroma—2 to 8
Texture—stratified fine sandy loam, sandy loam, silt loam, loam, or loamy fine sand

Koszta Series

Typical Pedon

Koszta silt loam, 0 to 2 percent slopes, 2,200 feet west and 2,400 feet north of the southeast corner of sec. 21, T. 75 N., R. 12 W.; USGS Sigourney, Iowa, topographic quadrangle; lat. 41 degrees 17 minutes 09 seconds N. and long. 92 degrees 14 minutes 44 seconds W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak very fine and fine granular structure; friable; common fine and medium roots; common medium vesicular pores; neutral; abrupt smooth boundary.

E—9 to 15 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak thick platy structure parting to moderate fine subangular blocky; friable; common fine and medium roots; common medium tubular pores; many distinct very pale brown (10YR 8/2) silt coats on faces of peds and in pores; few fine irregular masses of iron-manganese accumulation; slightly acid; clear smooth boundary.

Btg1—15 to 24 inches; brown (10YR 4/3) silty clay loam; moderate fine and medium subangular blocky structure; friable; few fine roots; few fine tubular pores; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds and very few distinct very pale brown (10YR 8/2) silt coats on faces of peds and in pores; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; moderately acid; gradual smooth boundary.

Btg2—24 to 37 inches; grayish brown (10YR 5/2) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few fine tubular pores; common distinct gray (10YR 5/1) clay films on faces of peds and very few distinct very pale brown (10YR 8/2) silt coats on faces of peds and in pores; common fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; moderately acid; gradual smooth boundary.

Btg3—37 to 48 inches; grayish brown (10YR 5/2) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; few fine tubular pores;

common distinct gray (10YR 5/1) clay films on faces of peds; many medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly acid; gradual smooth boundary.

Btg4—48 to 60 inches; grayish brown (10YR 5/2) silty clay loam; weak medium prismatic structure; friable; common distinct gray (10YR 5/1) clay films on faces of peds; many medium and coarse prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly acid; gradual smooth boundary.

Cg—60 to 80 inches; grayish brown (2.5Y 5/2) silty clay loam; massive; friable; many medium and coarse prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly acid.

Range in Characteristics

Thickness of the solum: 36 to 60 inches
Depth to carbonates: More than 70 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

E horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—silt loam

BE horizon (if it occurs):
Hue—10YR
Value—4
Chroma—2 or 3
Texture—silty clay loam

Btg horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—silty clay loam

Cg horizon:
Hue—2.5Y or 10YR
Value—4 to 6
Chroma—2 to 6
Texture—silty clay loam

Ladoga Series

Typical Pedon

Ladoga silt loam, 2 to 5 percent slopes, 1,850 feet west and 200 feet north of the southeast corner of sec. 19, T. 77 N., R. 11 W.; USGS Keswick, Iowa, topographic quadrangle; lat. 41 degrees 27 minutes 13 seconds N. and long. 92 degrees 10 minutes 03 seconds W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common fine roots; common fine vesicular pores; few distinct very dark grayish brown (10YR 3/2) (moist) silt coats on faces of peds; neutral; clear smooth boundary.

E—8 to 14 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak medium platy structure parting to weak very fine subangular blocky; friable; common fine roots; common fine vesicular pores; few distinct grayish brown (10YR 5/2) silt coats on faces of peds; common fine distinct very dark gray (10YR 3/1) organic coats in pores and root channels; few fine irregular masses of iron-manganese accumulation; neutral; clear smooth boundary.

Bt1—14 to 20 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; common fine vesicular pores; very few distinct light gray (10YR 7/2) (dry) silt coats on faces of peds and common clay films; few fine distinct yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly acid; clear smooth boundary.

Bt2—20 to 33 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine subangular blocky structure; friable; few fine and coarse roots; common fine vesicular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine faint yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; moderately acid; clear smooth boundary.

Bt3—33 to 42 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; few fine and coarse roots; common fine vesicular pores; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine prominent strong brown (7.5YR 5/6)

redoximorphic concentrations; common fine distinct grayish brown (2.5Y 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese accumulation; moderately acid; gradual smooth boundary.

Bt4—42 to 54 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure parting to moderate fine subangular blocky; friable; few fine and coarse roots; common fine vesicular pores; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; moderately acid; gradual smooth boundary.

BC—54 to 66 inches; yellowish brown (10YR 5/4) and grayish brown (10YR 5/2) silty clay loam; weak coarse subangular blocky structure; friable; few fine and coarse roots; common very fine tubular pores; many medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly acid; clear smooth boundary.

C—66 to 80 inches; yellowish brown (10YR 5/4) and grayish brown (10YR 5/2) silt loam; massive; friable; few fine roots; common very fine tubular pores; many medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly acid.

Range in Characteristics

Thickness of the solum: 36 to 80 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam

E horizon (if it occurs):
Hue—10YR
Value—4 or 5
Chroma—2
Texture—silt loam

BE horizon (if it occurs):
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—silty clay loam

Bt horizon:
Hue—10YR
Value—4 to 6
Chroma—2 to 4
Texture—silty clay loam or silty clay

BC horizon (if it occurs):
Hue—10YR
Value—5
Chroma—2 to 4
Texture—silty clay loam

C horizon:
Hue—10YR
Value—5
Chroma—2 to 4
Texture—silt loam

Lamoni Series

Taxadjunct feature: The Lamoni soils in this county do not have a mollic epipedon.

Typical Pedon

Lamoni silty clay loam, 9 to 14 percent slopes, moderately eroded, 2,300 feet north and 308 feet west of the southeast corner of sec. 7, T. 76 N., R. 10 W.; USGS South English, Iowa, topographic quadrangle; lat. 41 degrees 24 minutes 07 seconds N. and long. 92 degrees 02 minutes 40 seconds W.

Ap—0 to 6 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; 10 percent streaks and pockets of dark grayish brown (10YR 4/2) subsoil material; weak fine granular structure; friable; common fine roots; common fine vesicular pores; moderately acid; abrupt smooth boundary.

2Btg1—6 to 16 inches; dark grayish brown (10YR 4/2) clay; moderate medium subangular blocky structure; very firm; few fine roots; common fine vesicular pores; many distinct clay films on faces of peds; many fine and medium prominent yellowish red (5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; moderately acid; clear smooth boundary.

2Btg2—16 to 24 inches; grayish brown (2.5Y 5/2) clay; moderate medium and coarse subangular blocky structure; very firm; few fine roots; common fine vesicular pores; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many fine and medium prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; moderately acid; gradual smooth boundary.

2Btg3—24 to 36 inches; light brownish gray (2.5Y 6/2) clay loam; moderate coarse subangular blocky structure; firm; few fine roots; common fine vesicular pores; common distinct grayish brown (2.5Y 5/2) clay films on faces of peds; common fine and medium prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; 1 percent small pebbles; slightly acid; clear smooth boundary.

2BCg—36 to 61 inches; light brownish gray (2.5Y 6/2) clay loam; weak coarse prismatic structure; firm; common fine and medium prominent yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; 5 percent small pebbles; neutral; clear smooth boundary.

2Cg—61 to 80 inches; light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/6) clay loam; massive; friable; common fine and medium prominent strong brown (7.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; 2 percent small pebbles; neutral.

Range in Characteristics

Thickness of the solum: 48 to 65 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silty clay loam

2Btg horizon (upper part):
Hue—10YR or 2.5Y
Value—4
Chroma—2
Texture—silty clay or clay

2Btg horizon (lower part):
Hue—10YR, 2.5Y, or 5Y
Value—5 or 6
Chroma—1 to 6
Texture—clay or clay loam

2BCg and 2Cg horizons:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 6
Texture—clay loam

Lindley Series

Typical Pedon

Lindley loam, 25 to 40 percent slopes, 390 feet south and 1,800 feet east of the northwest corner of sec. 17, T. 76 N., R. 11 W.; USGS Keswick, Iowa, topographic quadrangle; lat. 41 degrees 23 minutes 38 seconds N. and long. 92 degrees 09 minutes 14 seconds W.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) and very dark grayish brown (10YR 3/2) loam, light brownish gray (10YR 6/2) dry; weak very fine and fine granular structure; friable; common fine roots; common fine tubular pores; 1 percent fine mixed pebbles; slightly acid; abrupt smooth boundary.

E—5 to 9 inches; dark grayish brown (10YR 4/2) loam, light brownish gray (10YR 6/2) dry; moderate thick platy structure; friable; few fine roots; few fine tubular pores; common distinct brown (10YR 5/3) silt coats on faces of peds; few very dark grayish brown (10YR 3/2) organic coats in pores and root channels; 1 percent fine mixed pebbles; slightly acid; clear smooth boundary.

BE—9 to 15 inches; brown (10YR 4/3) clay loam; weak very thick platy structure parting to moderate very fine and fine subangular blocky; friable; few fine roots; few fine tubular pores; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; common distinct brown (10YR 5/3) silt coats on faces of peds; few fine irregular masses of iron-manganese; 1 percent fine mixed pebbles; slightly acid; clear smooth boundary.

Bt1—15 to 22 inches; strong brown (7.5YR 5/4 and 5/6) clay loam; moderate very fine and fine subangular blocky structure; firm; few fine roots; few fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds and in pores; few distinct brown (10YR 5/3) silt coats on faces of peds; very few prominent dark gray (10YR 4/1) organic coats in root channels and/or pores; common fine distinct strong brown (7.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; 1 percent fine mixed pebbles; moderately acid; gradual smooth boundary.

Bt2—22 to 29 inches; strong brown (7.5YR 5/4 and 5/6) clay loam; moderate fine and medium subangular blocky structure; firm; few fine roots; few fine tubular pores; common distinct dark yellowish brown (10YR 4/4) clay films on faces of

peds and in pores; very few prominent dark grayish brown (10YR 4/2) organic coats in root channels and/or pores; common fine distinct strong brown (7.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; 1 percent fine mixed pebbles; moderately acid; gradual smooth boundary.

Bt3—29 to 44 inches; strong brown (7.5YR 5/4 and 5/6) clay loam; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; firm; few fine roots; few fine tubular pores; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds and in pores; common fine distinct strong brown (7.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; 1 percent fine mixed pebbles; strongly acid; gradual smooth boundary.

Bt4—44 to 59 inches; yellowish brown (10YR 5/6) clay loam; moderate medium prismatic structure parting to moderate medium and coarse subangular blocky; firm; few fine roots; few fine tubular pores; few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds and in pores; many fine distinct strong brown (7.5YR 5/8) redoximorphic concentrations; common fine prominent grayish brown (10YR 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese; 1 percent fine mixed pebbles; moderately acid; gradual smooth boundary.

C—59 to 80 inches; yellowish brown (10YR 5/4) clay loam; massive; firm; few fine irregular masses of iron-manganese; 1 percent fine mixed pebbles; moderately acid.

Range in Characteristics

Thickness of the solum: 30 to 60 inches
Content of rock fragments: 1 to 3 percent

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—1 or 2
Texture—loam

E horizon (if it occurs):
Hue—10YR
Value—4 to 6
Chroma—2 to 4
Texture—loam or silt loam

BE horizon (if it occurs):
Hue—10YR
Value—4 to 6
Chroma—2 to 4
Texture—clay loam or loam

Bt horizon:
Hue—10YR or 7.5YR
Value—4 or 5
Chroma—4 to 6
Texture—clay loam

C horizon:
Hue—10YR or 7.5YR
Value—4 to 6
Chroma—1 to 6
Texture—clay loam

Mahaska Series

Typical Pedon

Mahaska silty clay loam, 0 to 2 percent slopes, 278 feet east and 1,675 feet north of the center of sec. 34, T. 77 N., R. 10 W.; USGS Kinross, Iowa, topographic quadrangle; lat. 41 degrees 26 minutes 11 seconds N. and long. 91 degrees 59 minutes 33 seconds W.

Ap—0 to 7 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky and moderate fine angular blocky structure; friable; few fine roots; few fine tubular pores; slightly acid; abrupt smooth boundary.

A1—7 to 13 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure parting to moderate fine granular; friable; few fine roots; few fine tubular pores; slightly acid; clear smooth boundary.

A2—13 to 18 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure; friable; few fine roots; few fine tubular pores; few fine irregular masses of iron-manganese; slightly acid; gradual smooth boundary.

BA—18 to 24 inches; dark grayish brown (2.5Y 4/2) and olive brown (2.5Y 4/4) silty clay loam, very dark grayish brown (10YR 3/2) kneaded; weak medium prismatic structure parting to moderate very fine and fine subangular blocky; friable; few fine roots; few fine tubular pores; many distinct very dark gray (10YR 3/1) organic coats on faces of peds; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

Bt—24 to 30 inches; light olive brown (2.5Y 5/3) silty clay; weak fine prismatic structure parting to moderate fine subangular blocky; firm; few fine

roots; few fine tubular pores; common distinct dark gray (10YR 4/1) clay films on faces of peds and common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; very few distinct very dark gray (10YR 3/1) organic coats on faces of peds; common fine prominent yellowish brown (10YR 5/8) redoximorphic concentrations; common fine faint grayish brown (2.5Y 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

Btg1—30 to 40 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few fine tubular pores; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine prominent yellowish brown (10YR 5/6) and common fine prominent brown (7.5YR 4/4) redoximorphic concentrations; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

Btg2—40 to 51 inches; light olive gray (5Y 6/2) silty clay loam; weak medium prismatic structure; friable; few fine roots; few fine tubular pores; many distinct olive gray (5Y 5/2) clay films on faces of peds and few faint dark gray (10YR 4/1) clay films in root channels and/or pores; few distinct black (10YR 2/1) organic coats on vertical faces of peds; common fine and medium prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; gradual smooth boundary.

Btg3—51 to 61 inches; olive gray (5Y 5/2) silty clay loam; weak coarse prismatic structure; friable; few fine roots; few fine tubular pores; few faint gray (5Y 5/1) clay films in root channels and/or pores; very few distinct black (10YR 2/1) organic coats on faces of peds; common fine prominent yellowish brown (10YR 5/6) and few coarse prominent strong brown (7.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; gradual smooth boundary.

Cg—61 to 80 inches; gray (5Y 6/1) silty clay loam; massive with a few vertical cleavage faces; friable; few fine tubular pores; very few distinct black (10YR 2/1) organic coats on faces of peds; common fine prominent yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral.

Range in Characteristics

Thickness of the solum: 48 to 70 inches
Thickness of the mollic epipedon: 14 to 24 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silty clay loam

BA horizon:
Hue—2.5Y or 10YR
Value—3 or 4
Chroma—2 to 4
Texture—silty clay loam

Bt horizon:
Hue—2.5Y or 10YR
Value—4 or 5
Chroma—3
Texture—silty clay loam or silty clay

Btg horizon:
Hue—2.5Y or 5Y
Value—4 to 6
Chroma—2 or 3
Texture—silty clay loam

Cg horizon:
Hue—2.5Y or 5Y
Value—4 to 6
Chroma—1 or 2
Texture—silty clay loam

Nira Series

Taxadjunct feature: The Nira soil in map unit 570C2 does not have a mollic epipedon.

Typical Pedon

Nira silty clay loam, 5 to 9 percent slopes, 1,340 feet west and 240 feet south of the northeast corner of sec. 34, T. 77 N., R. 10 W.; USGS Kinross, Iowa, topographic quadrangle; lat. 41 degrees 26 minutes 18 seconds N. and long. 91 degrees 59 minutes 22 seconds W.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak very fine and fine subangular blocky structure; friable; few fine roots; few fine tubular pores; slightly acid; abrupt smooth boundary.

A—7 to 11 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak fine subangular

blocky structure; friable; few fine roots; few fine tubular pores; slightly acid; clear smooth boundary.

Bw1—11 to 16 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; few fine tubular pores; few distinct clay films on faces of peds; many distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds; common fine distinct grayish brown (2.5Y 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese; moderately acid; clear smooth boundary.

Bw2—16 to 20 inches; brown (10YR 4/3) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few fine tubular pores; few distinct clay films on faces of peds; common distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds; many fine distinct grayish brown (2.5Y 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese; moderately acid; clear smooth boundary.

Bw3—20 to 25 inches; olive gray (5Y 5/2) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few fine tubular pores; few distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds; many fine prominent yellowish brown (10YR 5/4), few fine prominent strong brown (7.5YR 5/8), and few fine prominent yellowish red (5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; slightly acid; clear smooth boundary.

Bw4—25 to 31 inches; olive gray (5Y 5/2) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; few fine tubular pores; common fine prominent yellowish brown (10YR 5/4) and few fine prominent strong brown (7.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; slightly acid; gradual smooth boundary.

BC—31 to 40 inches; olive gray (5Y 5/2) silty clay loam; weak coarse prismatic structure parting to weak medium and coarse subangular blocky; friable; few fine roots; few fine tubular pores; common fine prominent yellowish brown (10YR 5/4) and common fine and medium prominent strong brown (7.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; slightly acid; gradual smooth boundary.

C1—40 to 55 inches; light olive gray (5Y 6/2) silty clay loam; massive; friable; few fine roots; few fine tubular pores; common fine and medium prominent yellowish brown (10YR 5/4) and many medium and coarse prominent strong brown (7.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; gradual smooth boundary.

C2—55 to 80 inches; olive gray (5Y 5/2) and gray (5Y 5/1) silty clay loam; massive; friable; common medium and coarse prominent yellowish brown (10YR 5/4) and many coarse prominent strong brown (7.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral.

Range in Characteristics

Thickness of the solum: 30 to 50 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silty clay loam

Bw horizon (upper part):
Hue—10YR
Value—4 or 5
Chroma—1 to 4
Texture—silty clay loam

Bw horizon (lower part to a depth of 30 inches):
Hue—2.5Y or 5Y
Value—5 or 6
Chroma—1 or 2
Texture—silty clay loam

BC horizon (if it occurs):
Hue—2.5Y or 5Y
Value—5 or 6
Chroma—1 or 2
Texture—silty clay loam

C horizon:
Hue—2.5Y or 5Y
Value—5 or 6
Chroma—1 or 2
Texture—silty clay loam

Nodaway Series

Typical Pedon

Nodaway silt loam, 0 to 2 percent slopes, frequently flooded, 2,000 feet south and 1,100 feet east of the northwest corner of sec. 34, T. 75 N., R. 10 W.; USGS Keota, Iowa, topographic quadrangle; lat. 41 degrees 15 minutes 37 seconds N. and long. 91 degrees 59 minutes 53 seconds W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine and fine granular structure; friable; few fine roots; few fine tubular pores; neutral; abrupt smooth boundary.

C—9 to 80 inches; stratified very dark grayish brown (10YR 3/2), dark grayish brown (10YR 4/2), and yellowish brown (10YR 5/4) silt loam with many very thin strata of silty clay loam, sandy loam, and loam and a few very thin strata of loamy sand; massive but tending towards platy structure because of stratification; friable; few fine roots; few fine tubular pores; one 4-inch-thick stratum of loamy sand at a depth of 70 inches; one 2-inch-thick stratum of loamy sand at a depth of 77 inches; neutral.

Range in Characteristics

Thickness of the solum: 6 to 10 inches

Ap horizon:
Hue—10YR
Value—3
Chroma—1 or 2
Texture—silt loam

C horizon:
Hue—10YR
Value—3 to 5
Chroma—1 to 4
Texture—stratified silt loam

Nordness Series

Typical Pedon

Nordness loam, in an area of Nordness-Eleva complex, 25 to 40 percent slopes, 100 feet north and 1,500 feet west of the southeast corner of sec. 28, T. 75 N., R. 10 W.; USGS Harper, Iowa, topographic quadrangle; lat. 41 degrees 15 minutes 57 seconds N. and long. 92 degrees 00 minutes 27 seconds W.

A—0 to 4 inches; very dark gray (10YR 3/1) and very dark grayish brown (10YR 3/2) loam, gray (10YR 5/1) dry; weak very fine and fine granular structure; friable; many fine and medium roots; common fine tubular pores; 10 percent rock fragments; neutral; clear smooth boundary.

BE—4 to 7 inches; dark yellowish brown (10YR 4/4) loam, pale brown (10YR 6/3) dry; weak very fine subangular blocky structure; friable; common fine and medium roots; few fine tubular pores; 30 percent rock fragments; neutral; clear smooth boundary.

2Bt—7 to 11 inches; brown (7.5YR 4/4) clay loam; weak very fine subangular blocky structure; friable; few fine roots; few fine tubular pores; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; 40 percent rock fragments; neutral; clear smooth boundary.

2R1—11 to 14 inches; level bedded limestone bedrock; rock slabs make up 60 percent, by volume; clay loam material between rock fragments; friable; few fine roots; few fine tubular pores; neutral; abrupt irregular boundary.

2R2—14 to 80 inches; hard, fractured limestone bedrock.

Range in Characteristics

Thickness of the solum: 8 to 20 inches
Depth to bedrock: 8 to 20 inches
Content of rock fragments: 1 to 10 percent

A horizon:
Hue—10YR
Value—3 or 4
Chroma—1 to 3
Texture—loam

E horizon (if it occurs):
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—loam or silt loam

BE horizon:
Hue—10YR
Value—4
Chroma—3 or 4
Texture—clay loam, silty clay loam, loam, or silt loam

2Bt horizon:
Hue—7.5YR or 5YR
Value—3 to 5
Chroma—2 to 6
Texture—silt loam, silty clay loam, loam, or clay loam

Olmitz Series

Typical Pedon

Olmitz loam, 5 to 9 percent slopes, 150 feet west and 600 feet north of the southeast corner of sec. 27, T. 75 N., R. 10 W.; USGS Keota, Iowa, topographic quadrangle; lat. 41 degrees 16 minutes 02 seconds N. and long. 91 degrees 59 minutes 00 seconds W.

Ap—0 to 9 inches; black (10YR 2/1) loam, dark gray

(10YR 4/1) dry; weak fine granular structure; friable; few fine roots; few fine tubular pores; slightly acid; abrupt smooth boundary.

A1—9 to 22 inches; black (10YR 2/1) loam, gray (10YR 5/1) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; few fine roots; few fine tubular pores; slightly acid; gradual smooth boundary.

A2—22 to 32 inches; very dark grayish brown (10YR 3/2) clay loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to moderate fine subangular blocky; friable; few fine roots; few fine tubular pores; moderately acid; gradual smooth boundary.

Bw1—32 to 42 inches; dark brown (10YR 3/3) clay loam, brown (10YR 4/3) kneaded; weak medium subangular blocky structure parting to moderate fine subangular blocky; friable; few fine roots; few fine tubular pores; few distinct brown (10YR 5/3) silt coats on faces of peds and in pores; many distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

Bw2—42 to 53 inches; brown (10YR 4/3) clay loam; weak fine prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; few fine tubular pores; common distinct brown (10YR 5/3) silt coats on faces of peds and in pores; very few distinct dark grayish brown (10YR 4/2) organic coats in root channels and/or pores; common fine faint dark yellowish brown (10YR 4/4) redoximorphic concentrations; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

BC—53 to 64 inches; brown (10YR 4/3) clay loam; weak medium prismatic structure parting to weak medium subangular blocky; friable; very few distinct dark grayish brown (10YR 4/2) organic coats in root channels and/or pores and common distinct brown (10YR 5/3) silt coats on faces of peds and in pores; common fine distinct yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

C1—64 to 77 inches; dark yellowish brown (10YR 4/6) clay loam; massive; friable; many medium and coarse grayish brown (2.5Y 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

C2—77 to 80 inches; dark yellowish brown (10YR 4/6) clay loam; massive; friable; many medium and coarse gray (10YR 5/1) redoximorphic depletions; few fine irregular masses of iron-manganese; moderately acid.

Range in Characteristics

Thickness of the solum: 36 to 65 inches
Thickness of the mollic epipedon: 24 to 32 inches

Ap horizon:
Hue—10YR
Value—2
Chroma—1 or 2
Texture—loam

A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—loam or clay loam

Bw horizon:
Hue—10YR
Value—3 to 5
Chroma—3 or 4
Texture—clay loam

BC horizon (if it occurs):
Hue—10YR
Value—4 or 5
Chroma—3 to 5
Texture—clay loam

C horizon:
Hue—10YR
Value—4 to 6
Chroma—3 to 6
Texture—clay loam

Otley Series

Taxadjunct feature: The Otley soils in map units 281B2, 281C2, and 281D2 do not have a mollic epipedon.

Typical Pedon

Otley silty clay loam, 2 to 5 percent slopes, 154 feet east and 840 feet north of the center of sec. 34, T. 77 N., R. 10 W.; USGS Kinross, Iowa, topographic quadrangle; lat. 41 degrees 26 minutes 03 seconds N. and long. 91 degrees 59 minutes 36 seconds W.

Ap—0 to 7 inches; black (10YR 2/1) silty clay loam, gray (10YR 5/1) dry; moderate medium subangular blocky structure parting to weak fine granular; friable; few fine roots; few fine tubular pores; neutral; abrupt smooth boundary.

A1—7 to 12 inches; black (10YR 2/1) silty clay loam,

very dark brown (10YR 2/2) kneaded, gray (10YR 5/1) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; few fine roots; few fine tubular pores; neutral; gradual smooth boundary.

A2—12 to 17 inches; very dark brown (10YR 2/2) and very dark grayish brown (10YR 3/2) silty clay loam, very dark grayish brown (10YR 3/2) kneaded, grayish brown (10YR 5/2) and gray (10YR 5/1) dry; weak very fine subangular blocky structure parting to moderate fine granular; friable; few fine roots; few fine tubular pores; slightly acid; clear smooth boundary.

Bt1—17 to 26 inches; brown (10YR 4/3) silty clay loam, light brownish gray (10YR 6/2) dry; moderate very fine subangular blocky structure; firm; few fine roots; few fine tubular pores; very few faint clay films on faces of peds and in pores; few fine irregular masses of iron-manganese; slightly acid; gradual smooth boundary.

Bt2—26 to 32 inches; yellowish brown (10YR 5/4) silty clay loam; moderate very fine and fine subangular blocky structure; firm; few fine roots; few fine tubular pores; few distinct brown (10YR 4/3) clay films on faces of peds; few fine prominent dark reddish brown (5YR 3/3) redoximorphic concentrations; few fine prominent dark grayish brown (2.5Y 4/2) redoximorphic depletions; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

Bt3—32 to 40 inches; grayish brown (2.5Y 5/2) silty clay loam; weak medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few fine roots; few fine tubular pores; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few medium distinct dark brown (10YR 3/3) and few fine prominent dark reddish brown (5YR 3/3) redoximorphic concentrations; few fine irregular masses of iron-manganese; slightly acid; gradual smooth boundary.

Bt4—40 to 46 inches; dark grayish brown (2.5Y 4/2) silty clay loam; weak medium prismatic structure parting to strong medium angular blocky; friable; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; few fine prominent yellowish brown (10YR 5/4) and common fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; slightly acid; gradual smooth boundary.

Bt5—46 to 53 inches; grayish brown (2.5Y 5/2) silty clay loam; weak coarse prismatic structure parting to moderate medium and coarse angular blocky; friable; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; common medium prominent strong brown (7.5YR 5/6) and common medium prominent yellowish brown (10YR 5/4) redoximorphic concentrations; few fine irregular masses of iron-manganese; slightly acid; diffuse wavy boundary.

Bt6—53 to 61 inches; olive gray (5Y 5/2) silty clay loam; weak coarse prismatic structure parting to weak coarse angular blocky; friable; very few distinct dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; many fine and medium prominent brownish yellow (10YR 6/6) and common medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; very few prominent dark brown (10YR 3/3) oxide coats in root channels and/or pores; neutral; diffuse smooth boundary.

C1—61 to 73 inches; olive gray (5Y 5/2) silty clay loam; massive; friable; common medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; very few prominent dark brown (10YR 3/3) oxide coats in root channels and/or pores; neutral; diffuse smooth boundary.

C2—73 to 80 inches; light olive gray (5Y 6/2) silty clay loam; massive; friable; common medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; very few prominent dark brown (10YR 3/3) oxide coats in root channels and/or pores; neutral.

Range in Characteristics

Thickness of the solum: 48 to 72 inches
Thickness of the mollic epipedon: 10 to 20 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silty clay loam

Bt horizon (upper part):
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 or 4
Texture—silty clay loam or silty clay

Bt horizon (lower part):
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—2 to 4
Texture—silty clay loam

C horizon:
Hue—10YR, 2.5Y, or 5Y
Value—5 or 6
Chroma—2 to 8
Texture—silty clay loam or silt loam

Rinda Series

Typical Pedon

Rinda silty clay loam, 5 to 9 percent slopes, moderately eroded, 65 feet east and 1,700 feet north of the center of sec. 3, T. 75 N., R. 10 W.; USGS Keota, Iowa, topographic quadrangle; lat. 41 degrees 20 minutes 08 seconds N. and long. 91 degrees 59 minutes 43 seconds W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; 25 percent streaks and pockets of dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) subsoil material; weak fine subangular blocky structure parting to moderate very fine and fine granular; friable; few fine roots; few fine tubular pores; neutral; abrupt smooth boundary.

BE—9 to 15 inches; grayish brown (2.5Y 5/2) silty clay loam; weak thick platy structure parting to moderate very fine and fine subangular blocky; friable; few fine roots; few fine tubular pores; few distinct brown (10YR 5/3) silt coats on faces of peds; many fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; slightly acid; clear smooth boundary.

Btg1—15 to 20 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate very fine and fine subangular blocky structure; firm; few fine roots; few fine tubular pores; few distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; common fine and medium prominent yellowish brown (10YR 5/6) redoximorphic concentrations; common fine distinct dark gray (10YR 4/1) redoximorphic depletions; few fine irregular masses of iron-manganese; slightly acid; gradual smooth boundary.

2Btg2—20 to 32 inches; grayish brown (2.5Y 5/2) silty clay; moderate medium prismatic structure parting to moderate medium subangular blocky; very firm; few fine roots; few fine tubular pores; many prominent dark grayish brown (2.5Y 4/2) clay films on faces of peds; common fine and medium prominent dark yellowish brown (10YR 4/6) redoximorphic concentrations; many fine and medium distinct dark gray (10YR 4/1) redoximorphic depletions; few fine irregular masses of iron-manganese; slightly acid; gradual smooth boundary.

2Btg3—32 to 45 inches; gray (10YR 5/1) clay; weak medium prismatic structure parting to moderate medium subangular blocky; very firm; few fine roots; few fine tubular pores; common prominent dark gray (10YR 4/1) clay films on faces of peds; many fine and medium prominent dark yellowish brown (10YR 4/6) and few fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; gradual smooth boundary.

2Btg4—45 to 60 inches; gray (10YR 6/1) clay; weak medium prismatic structure parting to weak medium subangular blocky; very firm; few fine roots; few fine tubular pores; common distinct dark gray (10YR 4/1) clay films on faces of peds; common fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; gradual smooth boundary.

2Btg5—60 to 69 inches; gray (10YR 6/1) clay; weak coarse prismatic structure; very firm; few fine roots; few fine tubular pores; few distinct gray (10YR 5/1) clay films on faces of peds; common fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; 1 percent pebbles; neutral; gradual smooth boundary.

2Btg6—69 to 80 inches; light brownish gray (2.5Y 6/2) clay; weak coarse prismatic structure; very firm; few fine roots; few fine tubular pores; very few faint gray (10YR 6/1) clay films on faces of peds; few fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; 1 percent pebbles; neutral.

Range in Characteristics

Thickness of the solum: 42 to more than 80 inches
Content of rock fragments: 1 to 3 percent

Ap horizon:
Hue—10YR
Value—3
Chroma—1 or 2
Texture—silty clay loam

BE horizon (if it occurs):
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2
Texture—silty clay loam or silty clay

Btg horizon (if it occurs):
Hue—10YR or 2.5Y

Value—4 to 6
Chroma—1 or 2
Texture—silty clay loam or silty clay

2Btg horizon:
Hue—10YR to 5Y
Value—4 to 6
Chroma—1 or 2
Texture—clay or silty clay

Rubio Series

Typical Pedon

Rubio silt loam, 0 to 2 percent slopes, 1,800 feet west and 220 feet north of the southeast corner of sec. 24, T. 76 N., R. 11 W.; USGS Harper, Iowa, topographic quadrangle; lat. 41 degrees 22 minutes 01 second N. and long. 92 degrees 04 minutes 15 seconds W.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, very dark grayish brown (10YR 3/2) kneaded, gray (10YR 5/1) dry; 5 percent streaks and pockets of grayish brown (10YR 5/2) material from the subsurface layer; weak fine subangular blocky structure parting to weak fine granular; friable; few fine roots; few fine tubular pores; neutral; abrupt smooth boundary.

E—8 to 14 inches; dark gray (10YR 4/1) and grayish brown (10YR 5/2) silt loam, white (10YR 8/1) dry; moderate medium platy structure; friable; few fine roots; few fine tubular pores; few fine distinct dark yellowish brown (10YR 4/4) redoximorphic concentrations; few fine irregular masses of iron-manganese; slightly acid; clear smooth boundary.

Btg1—14 to 18 inches; dark gray (10YR 4/1) and gray (10YR 5/1) silty clay loam; strong very fine subangular blocky structure; friable; few fine roots; few fine tubular pores; few faint clay films on faces of peds; common fine distinct dark yellowish brown (10YR 4/4) redoximorphic concentrations; few fine irregular masses of iron-manganese; slightly acid; gradual smooth boundary.

Btg2—18 to 22 inches; dark gray (5Y 4/1) silty clay loam; moderate medium prismatic structure parting to strong very fine subangular blocky; firm; few fine roots; few fine tubular pores; common distinct clay films on faces of peds; few fine prominent strong brown (7.5YR 5/8), common fine prominent yellowish brown (10YR 5/8), and common fine prominent light olive brown (2.5Y 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

Btg3—22 to 30 inches; gray (5Y 5/1) silty clay; moderate medium prismatic structure parting to strong very fine subangular blocky; firm; few fine roots; few fine tubular pores; common distinct clay films on faces of peds; common fine prominent light olive brown (2.5Y 5/4) and common fine prominent yellowish brown (10YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

Btg4—30 to 39 inches; olive gray (5Y 5/2) and light olive gray (5Y 6/2) silty clay loam; moderate medium prismatic structure parting to moderate fine subangular blocky; firm; few fine roots; few fine tubular pores; common distinct clay films on faces of peds; common fine prominent light olive brown (2.5Y 5/6) and common fine prominent yellowish brown (10YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

Btg5—39 to 46 inches; olive gray (5Y 5/2) silty clay loam; weak medium prismatic structure parting to moderate fine subangular blocky; friable; few fine roots; few fine tubular pores; common distinct olive gray (5Y 4/2) clay films on faces of peds; few fine prominent light olive brown (2.5Y 5/6) and few fine distinct olive (5Y 5/4) redoximorphic concentrations; few fine irregular masses of iron-manganese; moderately acid; gradual smooth boundary.

BCg—46 to 60 inches; olive gray (5Y 5/2) silty clay loam; weak medium prismatic structure parting to weak medium subangular blocky; friable; few faint dark gray (10YR 4/1) clay films on faces of peds; common fine prominent light olive brown (2.5Y 5/6) and common fine prominent yellowish brown (10YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; slightly acid; gradual smooth boundary.

Cg—60 to 80 inches; olive gray (5Y 5/2) silty clay loam; massive; friable; common fine prominent light olive brown (2.5Y 5/6) and common fine prominent yellowish brown (10YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral.

Range in Characteristics

Thickness of the solum: 42 to 72 inches

Ap horizon:
Hue—10YR
Value—3
Chroma—1 or 2
Texture—silt loam

E horizon:
Hue—10YR
Value—4 or 5
Chroma—1 or 2
Texture—silt loam

Btg horizon (upper part):
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—1
Texture—silty clay loam or silty clay

Btg horizon (lower part):
Hue—5Y
Value—5
Chroma—2
Texture—silty clay loam or silty clay

BCg horizon:
Hue—5Y
Value—4 or 5
Chroma—2
Texture—silty clay loam

Cg horizon:
Hue—5Y
Value—4 or 5
Chroma—2
Texture—silty clay loam

Shelby Series

Taxadjunct feature: The Shelby soils in this county do not have a mollic epipedon.

Typical Pedon

Shelby clay loam, 14 to 18 percent slopes, moderately eroded, 1,340 feet east and 90 feet south of the northwest corner of sec. 7, T. 77 N., R. 12 W.; USGS What Cheer, Iowa, topographic quadrangle; lat. 41 degrees 29 minutes 47 seconds N. and long. 92 degrees 17 minutes 31 seconds W.

Ap—0 to 7 inches; very dark brown (10YR 2/2) clay loam, dark grayish brown (10YR 4/2) dry; weak very fine and fine granular structure; friable; common fine roots; common fine vesicular pores; 10 percent streaks and pockets of brown (10YR 4/3) material from the subsurface layer; neutral; abrupt smooth boundary.

BA—7 to 12 inches; brown (10YR 4/3) clay loam; weak very fine and fine subangular blocky structure parting to weak very fine and fine granular; friable; few fine roots; few fine vesicular pores; few small pebbles; many prominent very dark grayish brown (10YR 3/2) organic coats on faces of peds; neutral; clear smooth boundary.

Bt1—12 to 20 inches; brown (10YR 4/3) clay loam; moderate very fine and fine subangular blocky structure; friable; few fine roots; few fine vesicular pores; few small pebbles; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine irregular masses of iron-manganese accumulation; slightly acid; gradual smooth boundary.

Bt2—20 to 27 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine and medium subangular blocky structure; firm; few fine roots; few fine vesicular pores; few small pebbles; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine prominent strong brown (7.5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; moderately acid; gradual smooth boundary.

Bt3—27 to 40 inches; yellowish brown (10YR 5/4) clay loam; moderate coarse prismatic structure parting to moderate medium and coarse subangular blocky; firm; few fine roots; few fine vesicular pores; few small pebbles; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly acid; gradual smooth boundary.

Bt4—40 to 50 inches; yellowish brown (10YR 5/4) clay loam; moderate coarse prismatic structure; firm; few fine roots; few fine vesicular pores; few small pebbles; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; common fine prominent light brownish gray (2.5Y 6/2) redoximorphic depletions; few fine irregular masses of iron-manganese accumulation; slightly acid; gradual smooth boundary.

BC—50 to 71 inches; yellowish brown (10YR 5/4) clay loam; weak coarse prismatic structure; firm; few fine roots; few fine vesicular pores; 3-inch lens of sandy clay loam at a depth of 68 inches; few small pebbles; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; common fine prominent light brownish gray (2.5Y 6/2) redoximorphic depletions; few fine irregular masses of iron-manganese accumulation; slightly acid; gradual smooth boundary.

C—71 to 80 inches; yellowish brown (10YR 5/4) and

light brownish gray (2.5Y 6/2) clay loam; massive; firm; few small pebbles; few fine irregular masses of iron-manganese accumulation; moderately alkaline.

Range in Characteristics

Thickness of the solum: 30 to 75 inches
Depth to carbonates: 40 to more than 75 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—clay loam

BA horizon or Bt horizon (upper part):
Hue—10YR
Value—3 or 4
Chroma—3 or 4
Texture—clay loam

Bt horizon (lower part):
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture—clay loam

BC horizon (if it occurs):
Hue—10YR or 2.5Y
Value—3 to 6
Chroma—2 to 6
Texture—clay loam

C horizon:
Hue—10YR or 2.5Y
Value—3 to 6
Chroma—2 to 6
Texture—clay loam

Sperry Series

Typical Pedon

Sperry silt loam, 0 to 1 percent slopes, 1,950 feet south of the northwest corner of sec. 28, T. 77 N., R. 11 W.; USGS Keswick, Iowa, topographic quadrangle; lat. 41 degrees 26 minutes 53 seconds N. and long. 92 degrees 08 minutes 31 seconds W.

Ap—0 to 8 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate very fine and fine granular structure; friable; few fine roots; few fine vesicular pores; neutral; abrupt smooth boundary.

A—8 to 12 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate fine and medium granular structure; friable; few fine roots; few fine vesicular pores; neutral; clear smooth boundary.

E1—12 to 15 inches; dark gray (10YR 4/1) silt loam, gray (10YR 6/1) dry; moderate medium platy structure; friable; few fine roots; few fine vesicular pores; very few distinct very dark gray (10YR 3/1) organic coats in root channels and/or pores and many distinct brown (10YR 5/3) silt coats on faces of peds; few fine prominent strong brown (7.5YR 5/8) and few fine prominent olive brown (2.5Y 4/4) redoximorphic concentrations; slightly acid; clear smooth boundary.

E2—15 to 20 inches; dark gray (10YR 4/1) silt loam, gray (10YR 6/1) dry; moderate thick platy structure parting to weak fine subangular blocky; friable; few fine roots; few fine vesicular pores; very few distinct very dark gray (10YR 3/1) organic coats in root channels and/or pores and many distinct brown (10YR 5/3) silt coats on faces of peds; few fine prominent strong brown (7.5YR 5/8) and few fine prominent olive brown (2.5Y 4/4) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; moderately acid; clear smooth boundary.

Btg1—20 to 27 inches; dark gray (10YR 4/1) silty clay loam; weak medium prismatic structure parting to strong very fine and fine subangular blocky; firm; few fine roots; few fine vesicular pores; many distinct clay films on faces of peds and very few distinct very dark gray (10YR 3/1) organic coats on faces of peds; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine prominent grayish brown (2.5Y 5/2) redoximorphic depletions; few fine irregular masses of iron-manganese accumulation; slightly acid; clear smooth boundary.

Btg2—27 to 32 inches; dark gray (10YR 4/1) and gray (10YR 5/1) silty clay; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; firm; few fine roots; few fine vesicular pores; many distinct clay films on faces of peds and very few distinct very dark gray (10YR 3/1) organic coats in root channels and/or pores; common fine prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly acid; clear smooth boundary.

Btg3—32 to 43 inches; gray (5Y 5/1) silty clay loam; moderate medium prismatic structure parting to moderate medium and coarse subangular blocky; firm; few fine roots; few fine vesicular pores; common distinct dark gray (10YR 4/1) clay films on faces of peds and very few distinct very dark gray (10YR 3/1) organic coats in root channels and/or pores; common fine and medium prominent strong brown (7.5YR 5/6) and few fine prominent

light olive brown (2.5Y 5/4) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly acid; clear smooth boundary.

BCg—43 to 60 inches; gray (5Y 5/1) silty clay loam; weak coarse prismatic structure; firm; few fine roots; few fine vesicular pores; very few distinct very dark gray (10YR 3/1) organic coats in root channels and/or pores; many medium and coarse prominent strong brown (7.5YR 5/6) and common medium and coarse prominent yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; neutral; gradual smooth boundary.

Cg—60 to 80 inches; light olive gray (5Y 6/2) silty clay loam; massive; firm; common fine and medium prominent strong brown (7.5YR 5/6) and common coarse prominent strong brown (7.5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; neutral.

Range in Characteristics

Thickness of the solum: 40 to 68 inches
Thickness of the mollic epipedon: 10 to 16 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1
Texture—silt loam

E horizon:
Hue—10YR
Value—4 or 5
Chroma—1 or 2
Texture—silt loam

Btg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—3 to 5
Chroma—1
Texture—silty clay loam or silty clay

BCg and Cg horizons:
Hue—2.5Y or 5Y
Value—5 or 6
Chroma—1 or 2
Texture—silty clay loam

Taintor Series

Typical Pedon

Taintor silty clay loam, 0 to 2 percent slopes, 1,371 feet east and 385 feet north of the southwest corner of sec. 27, T. 77 N., R. 10 W.; USGS Kinross, Iowa, topographic quadrangle; lat. 41 degrees 26 minutes 24 seconds N. and long. 91 degrees 59 minutes 58 seconds W.

Ap—0 to 6 inches; black (N 2/0) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine and medium angular blocky structure; friable; few fine roots; few fine tubular pores; slightly acid; abrupt smooth boundary.

A1—6 to 12 inches; black (N 2/0) silty clay loam, very dark gray (10YR 3/1) dry; moderate very fine subangular blocky structure parting to moderate fine granular; friable; few fine roots; few fine tubular pores; moderately acid; gradual smooth boundary.

A2—12 to 17 inches; black (N 2/0) silty clay loam, very dark gray (10YR 3/1) dry; moderate very fine subangular blocky structure parting to moderate fine granular; firm; few fine roots; few fine tubular pores; common fine faint very dark grayish brown (2.5Y 3/2) redoximorphic depletions; few fine irregular masses of iron-manganese; neutral; gradual smooth boundary.

BA—17 to 22 inches; very dark gray (10YR 3/1) silty clay, dark gray (10YR 4/1) dry; weak fine subangular blocky structure parting to moderate very fine subangular blocky; firm; few fine roots; few fine tubular pores; many distinct black (10YR 2/1) organic coats on faces of peds; common fine prominent light olive brown (2.5Y 5/4) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; gradual smooth boundary.

Btg1—22 to 28 inches; dark gray (5Y 4/1) silty clay; weak fine prismatic structure parting to moderate very fine and fine subangular blocky; firm; few fine roots; few fine tubular pores; common faint clay films on faces of peds; few prominent very dark gray (N 3/0) organic coats on vertical faces of peds; many fine prominent light olive brown (2.5Y 5/4) and common fine prominent yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; clear smooth boundary.

Btg2—28 to 34 inches; olive gray (5Y 5/2) silty clay loam; moderate coarse prismatic structure parting to moderate fine subangular blocky; firm; few fine roots; few fine tubular pores; common distinct dark gray (5Y 4/1) clay films on faces of peds; common fine prominent yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; clear wavy boundary.

Btg3—34 to 40 inches; olive gray (5Y 5/2) silty clay loam; moderate coarse prismatic structure parting to moderate fine and medium subangular blocky;

firm; few fine roots; few fine tubular pores; few distinct dark gray (5Y 4/1) clay films on faces of peds; common fine prominent light olive brown (2.5Y 5/4) and common medium prominent strong brown (7.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; gradual smooth boundary.

Btg4—40 to 58 inches; olive gray (5Y 5/2) and gray (5Y 5/1) silty clay loam; moderate coarse prismatic structure; firm; very few faint dark gray (5Y 4/1) clay films on faces of peds; common fine prominent yellowish brown (10YR 5/6) and common medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; common medium faint light olive gray (5Y 6/2) redoximorphic depletions; few fine irregular masses of iron-manganese; neutral; diffuse wavy boundary.

BCg—58 to 72 inches; olive gray (5Y 5/2) and gray (5Y 5/1) silty clay loam; weak coarse prismatic structure; friable; many fine and medium prominent strong brown (7.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; diffuse wavy boundary.

Cg—72 to 80 inches; light olive gray (5Y 6/2) and gray (5Y 5/1) silt loam; massive; friable; many medium and coarse prominent strong brown (7.5YR 5/8) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral.

Range in Characteristics

Thickness of the solum: 42 to 72 inches
Thickness of the mollic epipedon: 16 to 24 inches

Ap and A horizons:
Hue—10YR or N
Value—2 or 3
Chroma—0 or 1
Texture—silty clay loam

BA horizon (if it occurs):
Hue—10YR
Value—3
Chroma—1
Texture—silty clay or silty clay loam

Btg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—1 or 2
Texture—silty clay or silty clay loam

BCg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—1 or 2
Texture—silty clay loam

Cg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 or 2
Texture—silt loam

Tuskeego Series

Typical Pedon

Tuskeego silt loam, 0 to 2 percent slopes, occasionally flooded, 1,240 feet south and 1,600 feet west of the northeast corner of sec. 32, T. 75 N., R. 10 W.; USGS Harper, Iowa, topographic quadrangle; lat. 41 degrees 16 minutes 13 seconds N. and long. 92 degrees 01 minute 37 seconds W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure; friable; common fine roots; common fine vesicular pores; many distinct very dark brown (10YR 2/2) organic coats on faces of peds; moderately acid; abrupt smooth boundary.

E1—9 to 15 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak thick platy structure parting to moderate fine subangular blocky; friable; common fine roots; common fine vesicular pores; few distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds and few distinct light gray (10YR 7/2) silt coats on faces of peds; few fine distinct brown (7.5YR 4/4) redoximorphic concentrations; slightly acid; abrupt smooth boundary.

E2—15 to 19 inches; grayish brown (10YR 5/2) silty clay loam, light gray (10YR 7/2) dry; weak thick platy structure parting to moderate fine subangular blocky; friable; common fine roots; common fine vesicular pores; few distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds; few fine prominent brown (7.5YR 4/4) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; moderately acid; abrupt smooth boundary.

Btg1—19 to 26 inches; dark gray (10YR 4/1) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; common fine tubular pores; few prominent very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine prominent brown (7.5YR 4/4) redoximorphic concentrations; few fine irregular masses of iron-

manganese accumulation; slightly acid; clear smooth boundary.

Btg2—26 to 34 inches; dark gray (10YR 4/1) silty clay; moderate medium subangular blocky structure; firm; common fine tubular pores; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; common medium faint dark grayish brown (10YR 4/2) redoximorphic depletions and few fine prominent brown (7.5YR 4/4) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; slightly acid; gradual smooth boundary.

Btg3—34 to 47 inches; grayish brown (2.5Y 5/2) silty clay; moderate medium subangular blocky structure; firm; common fine tubular pores; common distinct dark gray (10YR 4/1) clay films on faces of peds; common fine distinct gray (10YR 5/1) redoximorphic depletions and common fine prominent yellowish brown (10YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; neutral; gradual smooth boundary.

Btg4—47 to 61 inches; grayish brown (2.5Y 5/2) silty clay; weak medium subangular blocky structure; firm; few distinct dark gray (10YR 4/1) clay films on faces of peds; common fine distinct gray (10YR 5/1) redoximorphic depletions and common fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; neutral; gradual smooth boundary.

Cg—61 to 80 inches; grayish brown (2.5Y 5/2) silty clay loam; massive; friable; many medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; neutral.

Range in Characteristics

Thickness of the solum: 48 to 72 inches
Depth to carbonates: More than 72 inches

Ap horizon:
Hue—10YR
Value—3
Chroma—1 or 2
Texture—silt loam

E horizon:
Hue—10YR
Value—4 to 6
Chroma—1 or 2
Texture—silt loam or silty clay loam

Btg horizon:
Hue—10YR or 2.5Y
Value—3 to 5
Chroma—1 or 2
Texture—silty clay or silty clay loam

Cg horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2
Texture—silty clay loam

Vesser Series

Typical Pedon

Vesser silt loam, 0 to 2 percent slopes, occasionally flooded, 340 feet south and 1,685 feet west of the northeast corner of sec. 16, T. 77 N., R. 10 W.; USGS South English, Iowa, topographic quadrangle; lat. 41 degrees 28 minutes 54 seconds N. and long. 92 degrees 00 minutes 34 seconds W.

Ap—0 to 7 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; few fine roots; few fine tubular pores; slightly acid; abrupt smooth boundary.

A—7 to 13 inches; black (10YR 2/1) silt loam, very dark gray (10YR 3/1) dry; weak thick platy structure parting to moderate fine granular; friable; few fine roots; few fine tubular pores; 23 percent clay; 15 percent sand; slightly acid; clear smooth boundary.

E1—13 to 17 inches; dark gray (10YR 4/1) (exterior) and dark grayish brown (10YR 4/2) (interior) silt loam, gray (10YR 6/1) (exterior) dry; moderate thick platy structure; friable; few fine roots; few fine tubular pores; common distinct light gray (10YR 7/1) (dry) silt coats on faces of peds and very few distinct very dark gray (10YR 3/1) organic coats in root channels and/or pores; common fine distinct brown (10YR 4/3) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; moderately acid; clear smooth boundary.

E2—17 to 23 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate thick platy structure; friable; few fine roots; few fine tubular pores; common distinct light gray (10YR 7/1) (dry) silt coats on faces of peds and very few distinct very dark gray (10YR 3/1) organic coats in root channels and/or pores; few fine prominent yellowish brown (10YR 5/6) and common fine distinct dark yellowish brown (10YR 4/4) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; moderately acid; clear smooth boundary.

E3—23 to 31 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine and medium subangular blocky structure; friable; few fine roots; few fine tubular pores; few distinct light gray (10YR 7/1) (dry) silt coats on faces of peds and very few distinct very dark gray (10YR 3/1) organic coats in root channels and/or pores; common fine prominent yellowish brown (10YR 5/6) and common fine distinct dark yellowish brown (10YR 4/4) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; moderately acid; gradual smooth boundary.

Btg1—31 to 47 inches; dark grayish brown (2.5Y 4/2) silty clay loam; moderate fine and medium subangular blocky structure; friable; few fine roots; few fine tubular pores; common distinct dark gray (5Y 4/1) clay films on faces of peds and in pores; common prominent light gray (10YR 7/1) (dry) silt coats on faces of peds; very few distinct very dark gray (10YR 3/1) organic coats in root channels and/or pores; common fine prominent yellowish brown (10YR 5/6) and common fine and medium prominent strong brown (7.5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; neutral; gradual smooth boundary.

Btg2—47 to 58 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate medium prismatic structure parting to moderate medium and coarse subangular blocky; friable; few fine roots; few fine tubular pores; few distinct dark gray (10YR 4/1) clay films on faces of peds and in pores; common fine prominent yellowish brown (10YR 5/6) and common fine and medium prominent strong brown (7.5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; neutral; gradual smooth boundary.

Btg3—58 to 64 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate medium and coarse subangular blocky structure; friable; few fine roots; few fine tubular pores; few distinct dark gray (10YR 4/1) clay films on faces of peds and in pores; common fine and medium prominent strong brown (7.5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; neutral; gradual smooth boundary.

Btg4—64 to 67 inches; gray (10YR 5/1) silty clay loam; weak medium subangular blocky structure; friable; few distinct dark gray (10YR 4/1) clay films on faces of peds and in pores; common fine and medium prominent strong brown (7.5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; neutral; gradual smooth boundary.

BCg—67 to 80 inches; grayish brown (2.5Y 5/2) silty clay loam; weak medium subangular blocky structure; friable; common fine and medium prominent strong brown (7.5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese accumulation; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 20 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

E horizon:
Hue—10YR
Value—3 to 5
Chroma—1 or 2
Texture—silt loam

Btg horizon:
Hue—10YR or 2.5Y
Value—3 to 5
Chroma—1 or 2
Texture—silty clay loam

BCg horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—1 or 2
Texture—silty clay loam

Watkins Series

Typical Pedon

Watkins silt loam, 2 to 5 percent slopes, 180 feet north and 1,240 feet east of the southwest corner of sec. 15, T. 77 N., R. 12 W.; USGS Keswick, Iowa, topographic quadrangle; lat. 41 degrees 28 minutes 03 seconds N. and long. 92 degrees 14 minutes 06 seconds W.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine granular structure; friable; few fine roots; few fine vesicular pores; neutral; abrupt smooth boundary.

E—9 to 15 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak thick platy structure parting to weak fine subangular blocky; friable; few fine roots; few fine tubular pores; common distinct very dark grayish

brown (10YR 3/2) organic coats on faces of peds; moderately acid; clear smooth boundary.

BE—15 to 23 inches; brown (10YR 4/3) silty clay loam; moderate fine and medium subangular blocky structure; friable; few fine roots; few fine tubular pores; few distinct very dark grayish brown (10YR 3/2) organic coats on faces of peds and common distinct dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; moderately acid; gradual smooth boundary.

Bt1—23 to 30 inches; brown (10YR 4/3) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few fine tubular pores; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; moderately acid; gradual smooth boundary.

Bt2—30 to 37 inches; brown (10YR 5/3) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few fine tubular pores; few distinct grayish brown (10YR 5/2) clay films on faces of peds and in pores; few fine distinct yellowish brown (10YR 5/6) redoximorphic concentrations; moderately acid; gradual smooth boundary.

Bt3—37 to 50 inches; grayish brown (10YR 5/2) silty clay loam; weak medium and coarse subangular blocky structure; friable; few fine roots; few fine tubular pores; few distinct clay films on faces of peds; common fine and medium distinct yellowish brown (10YR 5/6) redoximorphic concentrations; moderately acid; gradual smooth boundary.

BC—50 to 65 inches; grayish brown (10YR 5/2) silty clay loam; weak coarse subangular blocky structure; friable; common medium distinct yellowish brown (10YR 5/4) and common fine prominent brown (7.5YR 4/4) redoximorphic concentrations; slightly acid; clear smooth boundary.

2C—65 to 80 inches; yellowish brown (10YR 5/4 and 5/6) sand; single grain; loose; slightly acid.

Range in Characteristics

Thickness of the solum: 30 to 65 inches

Ap horizon:
Hue—10YR
Value—3
Chroma—1 or 2
Texture—silt loam

E horizon:
Hue—10YR
Value—4
Chroma—2
Texture—silt loam

BE horizon (if it occurs):
Hue—10YR
Value—4
Chroma—3 or 4
Texture—silt loam or silty clay loam

Bt horizon (upper part):
Hue—10YR
Value—4
Chroma—3 or 4
Texture—silty clay loam

Bt horizon (lower part):
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture—silty clay loam

BC horizon (if it occurs):
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture—silty clay loam

2C horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture—sand or loamy sand

Zook Series

Typical Pedon

Zook silty clay loam, 0 to 2 percent slopes, frequently flooded, 45 feet south and 865 feet east of the northwest corner of sec. 34, T. 75 N., R. 10 W.; USGS Keota, Iowa, topographic quadrangle; lat. 41 degrees 15 minutes 56 seconds N. and long. 91 degrees 59 minutes 55 seconds W.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure parting to moderate very fine and fine granular; friable; few fine roots; few fine tubular pores; neutral; abrupt smooth boundary.

A1—9 to 13 inches; black (N 2/0) silty clay, very dark gray (N 3/0) dry; weak fine subangular blocky structure parting to moderate fine and medium granular; firm; few fine roots; few fine tubular pores; neutral; clear smooth boundary.

A2—13 to 34 inches; black (N 2/0) silty clay, very dark gray (N 3/0) dry; moderate fine and medium subangular blocky structure parting to moderate fine and medium granular; firm; few fine roots; few

fine tubular pores; moderately acid; gradual smooth boundary.

A3—34 to 40 inches; very dark gray (10YR 3/1) silty clay, dark gray (5Y 4/1) dry; moderate fine and medium subangular blocky structure; firm; few fine roots; few fine tubular pores; few distinct black (N 2/0) organic coats on faces of peds; few fine prominent dark yellowish brown (10YR 4/6) redoximorphic concentrations; moderately acid; gradual smooth boundary.

Bg—40 to 51 inches; dark gray (5Y 4/1) silty clay; moderate medium and coarse subangular blocky structure; firm; few fine roots; few fine tubular pores; few distinct very dark gray (5Y 3/1) organic coats on faces of peds; common fine prominent dark yellowish brown (10YR 4/6) redoximorphic concentrations; common fine faint olive gray (5Y 4/2) redoximorphic depletions; few fine irregular masses of iron-manganese; slightly acid; gradual smooth boundary.

Cg1—51 to 67 inches; gray (5Y 5/1) silty clay; massive; firm; few fine roots; few fine tubular pores; many fine and medium prominent strong brown (7.5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; gradual smooth boundary.

Cg2—67 to 76 inches; gray (5Y 5/1) silty clay loam; massive; firm; common fine and medium prominent strong brown (7.5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; neutral; gradual smooth boundary.

Cg3—76 to 80 inches; gray (5Y 5/1) silty clay loam; massive; firm; common fine and medium prominent strong brown (7.5YR 4/6) redoximorphic concentrations; few fine irregular masses of iron-manganese; slightly acid.

Range in Characteristics

Thickness of the solum: 36 to 60 inches
Thickness of the mollic epipedon: 36 to 50 inches

Ap horizon:
Hue—10YR or N
Value—2 or 3
Chroma—0 or 1
Texture—silty clay loam or silt loam

A horizon:
Hue—10YR or N
Value—2 or 3
Chroma—0 or 1
Texture—silty clay loam or silty clay

Bg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—2 to 5
Chroma—1
Texture—silty clay or silty clay loam

Cg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—2 to 5
Chroma—1
Texture—silty clay, silty clay loam, or silt loam

Formation of the Soils

In this section, the major factors of soil formation are described as they relate to the soils of Keokuk County. The processes of horizon differentiation also are described.

Factors of Soil Formation

Soil forms through processes that act on deposited or accumulated geologic material. The characteristics of the soil at any given point are determined by the physical and mineralogical composition of the parent material; the climate under which the soil material has accumulated and existed since accumulation; the living organisms on and in the soil; relief, topography, or lay of the land; and the length of time the forces of soil formation have acted on the soil material (Jenny, 1941).

Climate and plant and animal life are the active factors of soil formation. They act on the parent material and slowly change it into a natural body that has genetically related horizons, or layers. The effects of climate and plant and animal life are conditioned by relief. The parent material affects the kind of profile that forms and in extreme cases determines it almost entirely. Finally, time is needed for the transformation of the parent material into a soil. Some time is always needed for the development of soil horizons. A long period of time generally is needed for the development of distinct horizons.

The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effect of any one factor unless conditions are specified for the others.

Parent Material

In Keokuk County, parent material has affected the general character of the soil profile. Most of the soils in the county formed in glacial till, or ice-laid material; in loess, or windblown material; or in alluvium, or water-deposited material. In some areas the soils formed in shale residuum, or material weathered from shale. In a few areas, limestone bedrock is the parent material. In a few other small areas, the soils formed in eolian, or windblown, sands.

Glacial till.—In Keokuk County the major Pleistocene depositions of pre-Wisconsin age are Nebraskan and Kansan (pre-Illinoian) drift (Scholtes and others, 1951). The Kansan drift is identifiable throughout the county. On upland side slopes, it forms an extensive part of the landscape. The Nebraskan drift, however, is not readily identifiable on the surface in Keokuk County.

In some deep road cuts and along some of the major stream valleys, the Aftonian paleosol is present below the Kansan glacial till (Kay, 1916; Kay and Apfel, 1929). This paleosol consists mainly of glacial till made up of coarse fragments in a clay loam matrix. The upper part of the till consists of yellowish brown material that is oxidized and leached. Below this zone is dark gray material that is calcareous, contains limestone and dolomite particles, and is neither oxidized nor leached.

Soils formed on the Kansan till plain during the Yarmouth and Sangamon interglacial periods before the loess was deposited. On nearly level interstream divides, the soils were strongly weathered and had a gray, plastic subsoil consisting of paleosol. The gumbotil that remains is several feet thick and is very slowly permeable. Ashgrove, Bucknell, Clarinda, Lamoni, and Rinda soils formed in this paleosol. These soils are extensive throughout Keokuk County.

Geologic erosion has cut below the Yarmouth-Sangamon paleosol and into the Kansan till and older deposits. Generally, a stone line or subjacent till that is overlain by pedisediment is at the depth to which this erosion has cut (Ruhe, 1956; Ruhe and Daniels, 1958). A paleosol has formed in the pedisediment stone line and in the subjacent till. Armstrong and Keswick soils formed in this material.

Geologic erosion removed the loess from many slopes and exposed strongly weathered paleosols. In some places, the paleosols have been beveled or truncated and only the lower part of the strongly weathered materials remains. In other places, erosion has removed all of the paleosols and has exposed till that is only slightly weathered. Erosion cut through to

below the Yarmouth-Sangamon paleosol during the Late Sangamon (Ruhe, 1956; Ruhe, 1959). The material below the paleosols consists of loamy sediments over a stone line that, in turn, is above a highly weathered, clayey, reddish brown, acid till. Material that formed in the late Sangamon period is exposed on the narrow, slightly lowered interstream divides on some side slopes.

Although Armstrong and Keswick soils formed in late Sangamon material, Douds and Galland soils formed in pre-Sangamon sediments of valley fills. These sediments are old alluvium of glacial origin and have various textures (Ruhe, 1959). Douds and Galland soils are on low, stepped interfluves above the present drainage system. They owe their landscape partly to valley fill, but their surface merges with the present erosional uplands. These soils are in distinctly lower positions on the landscape than Gara, Shelby, and Lindley soils, which formed on dissection slopes of late Wisconsin age. The Sangamon erosional sediments apparently have been angularly truncated in many places. As a result, they generally consist of an irregular mixture of materials that have contrasting textures.

Loess.—Loess of Wisconsin age covers much of the uplands of Keokuk County. This type of parent material is extensive in the county (Ruhe and others, 1957; Ruhe and Scholtes, 1955). It consists of accumulated particles of silt and clay that have been deposited by the wind. Variations in soils are related to the distance of the soils from the source of the loess. The source of the loess in Keokuk County is probably the bottom land along the Missouri River in the western part of Iowa (Hutton, 1947).

On the stable upland divides, the loess is about 10 to 12 feet thick (Schafer, 1955). Otley, Mahaska, and Taintor soils are the dominant loess soils in Keokuk County. Clinton, Fayette, Givin, Kalona, Keomah, Ladoga, Nira, Rubio, and Sperry soils also formed in loess. Many of the high stream terraces along the major streams are covered with loess. The loess on these high stream terraces contains less clay and slightly more sand than the loess that covers the adjacent uplands. The soil material underlying the loess in these areas is stratified alluvium or valley fill. The alluvium generally has a high content of sand and gravel.

Alluvium.—Alluvium consists of sediments that have been deposited by water. As these sediments move, they are sorted to some extent, but they are as well sorted as loess in only a few places. Also, alluvium does not have the wide range of particle sizes that occurs in glacial drift. The alluvium in Keokuk County is derived from loess and glacial drift, so it is mainly a mixture of silt and clay, of silt and sand, or of sand and gravel. The coarse sand and gravel generally are only in the pre-Sangamon alluvial sediments on the stream benches. Sediments that accumulated at the foot of the slope on which they originated are called colluvium or local alluvium.

The soils on flood plains, on bottom land, and along drainageways formed in alluvium. As a river overflows its channel and the water spreads over the flood plain, coarse textured material, such as sand and coarse silt, is deposited first. As the floodwater spreads, it moves more slowly and finer textured sediments are deposited. As the floodwater recedes, the clay particles, which are the finest in texture, settle from the water that is left standing on the lowest part of the flood plain.

Nodaway and Klum soils commonly are closest to the stream channel and are coarser textured than the other soils on bottom land. Chequest, Tuskeego, and Zook soils are along the Skunk River and its tributaries, commonly away from the meanders of the stream. Zook soils typically are on the lower part of the bottom land and are the finest textured soils derived from alluvium in the county. Ackmore, Coppock, and Vesser soils are along the smaller streams. Coppock and Vesser soils are widely distributed throughout the county. In places they formed in local alluvium at the base of upland slopes. Cantril and Olmitz soils are the dominant soils that formed in local alluvium in the county. They commonly contain more sand than the other soils that formed in alluvium. Typically, they are in lower positions on the landscape than those of the surrounding soils derived from glacial materials. Colo soils also formed in local alluvium.

In some areas the wind has carried fine sand from the stream channels and the flood plains to higher elevations (Prior, 1976). This dune sand has been deposited on low stream terraces, high stream terraces, and uplands fringing the leeward side of valleys. Chelsea soils formed in eolian sand that is more than 5 feet thick.

Shale residuum.—Some of the oldest parent material in the county is a series of shale beds deposited during the Des Moines sedimentary cycle in the Pennsylvanian period. These beds, or layers, consist of shale of different colors and textures. In places the shale material also contains conglomerates and a few organic layers, such as coal. The thickness of these layers varies widely.

Soils that formed in shale residuum in southern Iowa have a wide range in texture, reaction, and other characteristics. Colors of the shale range from nearly black to red, but red, brown, and grayish colors are dominant. Thin beds of sandstone and coal are

between layers of shale in places. Gosport soils formed in material weathered from brownish and grayish shales.

Limestone.—The oldest parent material in the county is a series of limestone beds deposited during the Mississippian and Pennsylvanian periods (Wood, 1935). The beds range from a few inches to several feet in thickness. Nordness soils formed in limestone. The thicker beds are good sources of road aggregate and agricultural lime.

Several layers of limestone are commonly exposed on the slopes along the major streams and their tributaries. In most places, this exposed rock is many feet thick and rock fragments are on the side slope below the outcrop.

Climate

The soils in Keokuk County have been forming under a midcontinental, subhumid climate for the past 5,000 years (Ruhe, 1956; Ruhe and others, 1957). The morphology and properties of the majority of the soils in Keokuk County indicate that this climate was similar to the present climate. From 6,500 to 16,000 years ago, however, the climate probably was cool and moist. This type of climate was conducive primarily to a growth of forest vegetation (Ruhe, 1956; Ruhe and others, 1957). A study indicates that the climate during the Sangamon period of the Pleistocene Epoch was cool and moist and conducive mainly to the growth of conifers (Lane, 1941).

The influence of the general climate in a region is modified by local conditions in or near the developing soils. For example, soils on south-facing slopes formed under a micro-climate that was warmer and drier than the average climate of nearby areas. The low-lying, poorly drained soils on bottom land formed under wetter and colder climate than that in most of the surrounding upland areas. These local differences influence the characteristics of the soils and account for some of the differences among soils in the same general climatic region.

Living Organisms

Many changes in climate and vegetation took place in Iowa during the post-glacial period (Lane, 1941; Ruhe, 1956). Spruce grew on the soils from 12,000 to 8,000 years ago. This type of vegetation was followed by a coniferous-deciduous forest, which lasted until about 6,500 years ago. At that time, grass became the dominant vegetation in the area.

For the past 5,000 years, the soils of Keokuk County have been influenced by prairie grasses and some trees. Big bluestem and little bluestem were the main prairie grasses. The dominant trees were deciduous—mainly oak, hickory, ash, elm, and maple.

The effects of vegetation on soils similar to those in Keokuk County have been studied recently. Evidence shows that the vegetation changed while soils formed in areas bordering trees and grasses. The morphology of Armstrong, Bucknell, Cantril, Coppock, Gara, Givin, Hedrick, Ladoga, Rinda, Rubio, and Tuskeego soils reflects the influence of both trees and grasses. Trees influenced the formation of Ashgrove, Chelsea, Clinton, Douds, Fayette, Galland, Gosport, Inton, Keomah, Keswick, Lindley, and Nordness soils (Prill and Riecken, 1958). Grasses influenced the formation of Chequest, Clarinda, Colo, Kalona, Lamoni, Mahaska, Nira, Olmitz, Otley, Shelby, Sperry, Taintor, Vesser, and Zook soils.

Important changes take place when the soil is cultivated. Some of these changes have little effect on productivity, while others have a drastic effect. The changes caused by water erosion generally are the most significant. On many of the cultivated soils in the county, particularly the gently rolling to hilly soils, part or all of the original surface layer has been lost through sheet erosion. In places, shallow to deep gullies have formed.

In many fields that are cultivated year after year, the granular structure that was apparent when the prairies were undisturbed has broken down. In these fields the soil surface tends to crust and harden when it dries. Fine textured soils that have been plowed when too wet are less permeable than similar soils in undisturbed areas.

Humans have increased the productivity of some soils. Large areas of bottom-land soils, such as Colo and Zook soils, have been made suitable for cultivation because drainage ditches have been dug and diversions have been constructed at the foot of upland slopes. The cropland in areas of Taintor and Kalona soils on broad upland flats has been greatly improved because a drainage system, such as subsurface tile, has been installed.

Deficiencies in plant nutrients have been counteracted in some areas. Some soils are more productive than they were in their natural state because of applications of commercial fertilizer.

Relief

Relief is an important cause of differences among soils. It indirectly influences soil formation through its effect on drainage. In Keokuk County, the soils range from level to very steep. In many areas on bottom land, the nearly level soils are occasionally flooded

and have a permanently or periodically high water table. In depressions, water soaks into the nearly level soils that are subject to flooding. Conversely, much of the rainfall runs off the steep soils on uplands.

Level soils are on the broad upland flats and on the stream bottoms. The steepest soils in the county are generally on the southern and western sides of major streams and their tributaries. The intricate pattern of upland drainageways indicates that the landscape in nearly the entire county has been modified by geologic processes.

Kalona, Rubio, Sperry, Taintor, and similar soils, which formed in areas where the water table is high, have a dominantly grayish subsoil. Givin, Ladoga, Mahaska, and similar soils formed in areas where the water table fluctuated and was periodically high. Gara, Lindley, and other soils that formed in areas where the water table was deeper in the soil profile have a yellowish brown or strong brown subsoil. Kalona, Taintor, and other soils formed under prairie grasses and have a high water table. They contain more organic matter in the surface layer than well drained soils that also formed under prairie grasses. Clay accumulates in the subsoil of Sperry and other soils that are in slight depressions or in nearly level areas. A large amount of water carries the clay particles downward. Sperry soils are locally known as “claypan” soils because they have a slowly permeable subsoil, in which the greatest amount of downward-moving clay has accumulated.

Gara, Shelby, and similar soils, which formed in glacial till, have a wide range in slope and are on many kinds of slopes. In these soils, the depth to carbonates is shallowest where the slopes are steepest, are convex, or are most unstable.

Time

The length of time required for a soil to form ultimately affects the kind of soil that is formed. An older or more strongly developed soil has well defined genetic horizons. A less well defined soil does not exhibit genetic horizons or has only weakly defined ones. Most soils on bottom land that are subject to frequent flooding are weakly developed because they have not been in place long enough for distinct horizons to develop.

On the steeper soils, material is generally removed before a thick profile with strongly developed horizons has had time to develop. Even though the material has been in place for a long time, the soil may be immature because much of the water runs off the slopes rather than through the soil profile. Shelby, Gara, and Lindley soils formed on recently dissected slopes of late Wisconsin age (Ruhe, 1956; Ruhe, 1959). These soils are no older than 11,000 to 14,000 years and are probably much younger.

Ashgrove, Armstrong, Keswick, Clarinda, Rinda, and Galland soils are among the oldest soils in the county (Ruhe, 1956; Ruhe and Scholtes, 1955). Clarinda, Rinda, and Ashgrove soils formed in pre-Illinoian (Kansan) till during the late Sangamon interglacial stage. This material is much older than the loess-derived parent material of such soils as Clinton, Kalona, Keomah, Ladoga, Mahaska, Otley, Nira, Sperry, and Taintor soils. These soils are no older than 14,000 to 16,000 years and may be considered younger.

Radiocarbon studies of wood fragments and organic matter in loess and glacial till have made it possible to determine the approximate ages of soils that formed in loess and glacial deposits in Iowa. In Keokuk County, the loess is thickest in areas of the nearly level soils on stable upland divides. It is underlain by a Yarmouth-Sangamon paleosol that is on the pre-Illinoian (Kansan) till surface. In many places below the stable uplands, an organic layer is at the base of the loess. Organic matter below the solum of loess soils in Wayne County, Iowa, had radiocarbon ages of 19,000 to 20,000 years.

Processes of Horizon Differentiation

Horizons are differentiated from each other when four basic kinds of changes take place. These changes are additions, removals, transfers, and transformations (Simonson, 1959). Each of these kinds of change affects many substances in the soils, such as organic matter, soluble salts, carbonates, sesquioxides, and silicate clay materials. Most of these processes tend to promote horizon differentiation, but some tend to offset or retard it. The processes and the resulting changes occur simultaneously in soils. The ultimate nature of the profile is governed by the balance of these changes within the soil.

An accumulation of organic matter generally is an early phase of horizon differentiation. It has been an important process in the differentiation of horizons in the soils of Keokuk County. The amount of organic matter that has accumulated in the surface layer of the soils ranges from high to low. In some soils, as a result of erosion, the content of organic matter is now lower than it was in the past.

The removal of substances from parts of the soil profile is important in the differentiation of horizons. The downward movement of calcium carbonates and

bases is an example. The upper part of the soils in Keokuk County has been leached of calcium carbonate. Many soils have been leached to the extent that they are strongly acid or very strongly acid, even in the subsoil.

Phosphorus is removed from the subsoil by plant roots and transferred to the parts of the plant growing above ground. It is then returned to the surface layer in the plant residue. This process affects the form and distribution of phosphorus in the soil profile.

The translocation of silicate clay minerals is another important process. The clay minerals in the surface layer are carried downward in suspension by percolating water. They accumulate in the subsoil as fillings in pores and root channels and as clay films on the faces of the soil structure. This process has affected many of the soils in the county. In other soils, however, the clay content of the surface layer is not markedly different from that of the underlying layer and other evidence of clay movement is minimal.

Another kind of transfer occurs when cracks form as a result of shrinking and swelling. Because of the cracks, some of the material from the surface layer is transferred to the lower parts of the profile. This transfer is minimal in most soils. It is most common in very clayey soils. It can occur in such soils as Clarinda and Zook soils.

Transformations are physical and chemical. The weathering of soil particles to smaller sizes is an example of a transformation. The reduction of iron is another example. This process is called gleying. It occurs when the soil is saturated for long periods. The soil contains enough organic matter for biological activity to take place during periods of saturation. Gleying is evidenced by ferrous iron and gray colors in the soil. It is characteristic of poorly drained soils, such as Taintor soils. The content of reductive extractable iron, or free iron, generally is lower in somewhat poorly drained soils, such as Mahaska soils (USDA, 1984). Another kind of transformation is the weathering of the primary apatite minerals in the parent material to secondary phosphorus compounds.

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Glossary

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Aspect. The direction in which a slope faces.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Backslope. The position that forms the steepest and generally linear, middle portion of a hillslope (fig. 17). In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Base slope. A geomorphic component of hills (fig. 17) consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

Beach deposits. Material, such as sand and gravel, that is generally laid down parallel to an active or relict shoreline of a post-glacial or glacial lake.

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bench (structural). A platformlike, nearly level to gently inclined erosional surface developed in resistant strata in areas where valleys are cut in alternating strong and weak layers that are essentially horizontal.

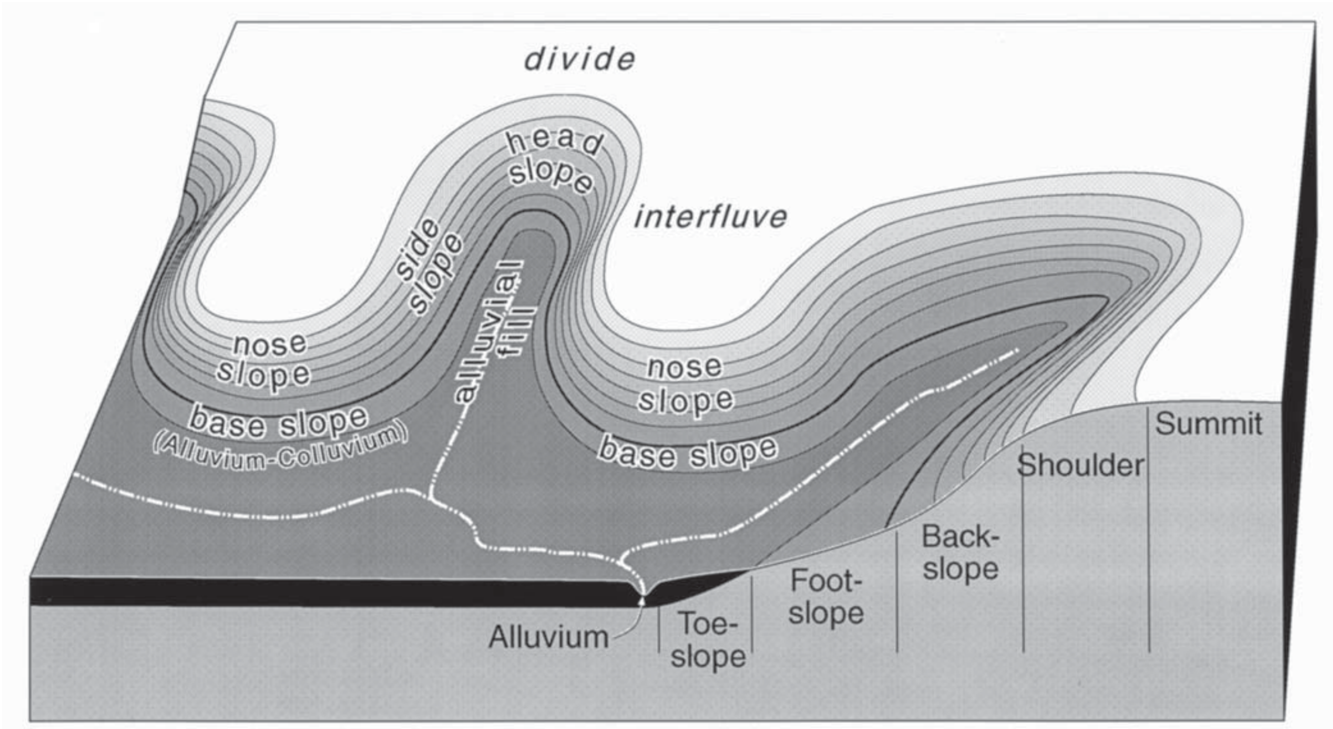


Figure 17.—Landscape relationship of geomorphic components and hillslope positions (modified after Ruhe and Walker, 1968).

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of

sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the “Soil Survey Manual.”

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of

regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Delta. A body of alluvium having a surface that is nearly flat and fan shaped; deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, generally a sea or lake.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divide. (a) The line of separation, or (b) the summit area, or narrow tract of higher ground that constitutes the watershed boundary between two adjacent drainage basins (fig. 17); it divides the surface waters that flow naturally in one direction from those that flow in the opposite direction.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the “Soil Survey Manual.”

Drainage, surface. Runoff, or surface flow of water, from an area.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Duff. A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.
Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.
Esker. A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.
Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.
Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.
Fast intake (in tables). The rapid movement of water into the soil.
Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.
Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.
Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.
Fine textured soil. Sandy clay, silty clay, or clay.
First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.
Flaggy soil material. Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.
Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.
Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.
Flood-plain splay. A fan-shaped deposit or other outspread deposit formed where an overloaded stream breaks through a levee (natural or artificial) and deposits its material (commonly coarse grained) on the flood plain.
Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.
Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope (fig. 17). In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).
Forb. Any herbaceous plant not a grass or a sedge.
Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.
Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.
Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.
Geomorphology. The science that treats the general configuration of the earth's surface; specifically the study of the classification, description, nature, origin, and development of landforms and their relationships to underlying structures, and the history of geologic changes as recorded by these surface features. The term is especially applied to the genetic interpretation of landforms.
Glacial drift. Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.
Glacial outwash. Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.
Glacial till. Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.
Glaciofluvial deposits. Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.
Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Gumbotil. A sticky clay formed by the thorough weathering of glacial drift.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head slope. A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway (fig. 17). The overland waterflow is converging.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-chroma zones. Zones having chroma of 3 or more. Typical color in areas of iron concentrations.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the “Soil Survey Manual.” The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil.

The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Ice-walled lake plain. A relict surface marking the floor of an extinct lake basin that was formed on solid ground and surrounded by stagnant ice in a stable or unstable superglacial environment on stagnation moraines. As the ice melted, the lake plain became perched above the adjacent landscape. The lake plain is well sorted, generally fine textured, stratified deposits.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Interfluve. An elevated area between two drainageways that sheds water to those drainageways (fig. 17).

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Iron concentrations. High-chroma zones having a high content of iron and manganese oxide because of chemical oxidation and accumulation, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic concentration.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface

through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame. An irregular, short ridge or hill of stratified glacial drift.

Kame moraine. An end moraine that contains numerous kames. A group of kames along the front of a stagnant glacier, commonly comprising the slumped remnants of a formerly continuous outwash plain built up over the foot of rapidly wasting or stagnant ice.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Knoll. A small, low, rounded hill rising above adjacent landforms.

Lacustrine deposit. Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lake bed. The bottom of a lake; a lake basin.

Lake plain. A nearly level surface marking the floor of an extinct lake filled by well sorted, generally fine textured, stratified deposits, commonly containing varves.

Lake terrace. A narrow shelf, partly cut and partly built, produced along a lakeshore in front of a scarp line of low cliffs and later exposed when the water level falls.

Lakeshore. A narrow strip of land in contact with or bordering a lake; especially the beach of a lake.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Low-chroma zones. Zones having chroma of 2 or less. Typical color in areas of iron depletions.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Marl. An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal amounts.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Meander scroll. One of a series of long, parallel, close fitting, crescent-shaped ridges and troughs formed along the inner bank of a stream meander as the channel migrated laterally down-valley and toward the outer bank.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine. An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral,

and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nose slope. A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside (fig. 17). The overland waterflow is predominantly divergent.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Paleoterrace. An erosional remnant of a terrace that retains the surface form and alluvial deposits of its origin but was not emplaced by, and commonly does not grade to, a present-day stream or drainage network.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Parts per million (ppm). The concentration of a substance in the soil, such as phosphorus or potassium, in one million parts of air-dried soil on a weight per weight basis.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment. A thin layer of alluvial material that mantles an erosion surface and has been transported to its present position from higher lying areas of the erosion surface.

Pedon. The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as “saturated hydraulic conductivity,” which is defined in the “Soil Survey Manual.” In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as “permeability.” Terms describing permeability, measured in inches per hour, are as follows:

Impermeable	less than 0.0015 inch
Very slow	0.0015 to 0.06 inch
Slow	0.06 to 0.2 inch

Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

Phosphorus. The amount of phosphorus available to plants at a depth of 30 to 42 inches is expressed in parts per million and based on the weighted average of air-dried soil samples. Terms describing the amount of available phosphorus are:

Very low	less than 7.5 ppm
Low	7.5 to 13.0 ppm
Medium	13.0 to 22.5 ppm
High	more than 22.5 ppm

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitted outwash plain. An outwash plain marked by many irregular depressions, such as kettles, shallow pits, and potholes, which formed by melting of incorporated ice masses.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plateau. An extensive upland mass with relatively flat summit area that is considerably elevated (more than 100 meters) above adjacent lowlands and separated from them on one or more sides by escarpments.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid or very rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potassium. The amount of potassium available to plants at a depth of 12 to 24 inches is expressed in parts per million and based on the weighted average of air-dried soil samples. Terms describing the amount of available potassium are:

Very low minus	less than 25 ppm
Very low plus	25 to 50 ppm
Low	50 to 79 ppm
Medium	79 to 125 ppm
High	more than 125 ppm

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been

removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprolite. Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Saturated hydraulic conductivity. See Permeability.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shoulder. The position that forms the uppermost inclined surface near the top of a hillslope (fig. 17). It is a transition from backslope to summit. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Side slope. A geomorphic component of hills consisting of a laterally planar area of a hillside (fig. 17). The overland waterflow is predominantly parallel.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Sloughed till. Water-saturated till that has flowed slowly downhill from its original place of deposit by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodium adsorption ratio (SAR). A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief and by the passage of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stagnation moraine. A body of drift released by the melting of a glacier that ceased flowing. Commonly but not always occurs near ice margins; composed of till, ice-contact stratified drift, and small areas of glacial lake sediment. Typical landforms are knob-and-kettle topography, locally including ice-walled lake plains.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stream terrace. A platform or series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream, and representing the remnants of an abandoned flood plain, stream bed, or valley floor produced during a former stage of fluvial erosion or deposition.

Stripcropping. Growing crops in a systematic

arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summit. The topographically highest position of a hillslope (fig. 17). It has a nearly level (planar or only slightly convex) surface.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Swale. A slight depression in the midst of generally level land. A shallow depression in an undulating ground moraine caused by uneven glacial deposition.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geomorphology). A steplike surface, bordering a valley floor or shoreline, that represents the former position of a flood plain, lakeshore, or seashore. The term is usually applied to both the relatively flat summit surface (tread), cut or built by stream or wave action, and the steeper descending slope (scarp or riser), graded to a lower base level of erosion.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.”

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Till. Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The position that forms the gently inclined surface at the base of a hillslope (fig. 17). Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited,

usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

Table 1.--Temperature and Precipitation

(Recorded in the period 1961-90 at Sigourney, Iowa)

Month	Temperature: Average daily maximum	Temperature: Average daily minimum	Temperature: Average	Temperature: 2 years in 10 will have-- Maximum temperature higher than--	Temperature: 2 years in 10 will have-- Minimum temperature lower than--	Temperature: Average number of growing degree days*	Precipitation: Average	Precipitation: 2 years in 10 will have-- Less than--	Precipitation: 2 years in 10 will have-- More than--	Precipitation: Average number of days with 0.10 inch or more	Precipitation: Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	30.3	11.7	21.0	59	-19	0	0.88	0.24	1.39	2	5.5
February---	35.9	16.3	26.1	65	-15	1	.74	.32	1.15	2	6.6
March------	48.1	28.2	38.1	80	0	38	2.26	.76	3.50	5	2.7
April------	62.6	40.1	51.4	87	18	150	3.71	1.93	5.27	6	1.7
May--------	73.6	51.4	62.5	90	32	377	3.81	2.04	5.37	7	.0
June-------	82.7	60.8	71.8	97	45	634	3.85	1.82	5.59	6	.0
July-------	87.1	65.6	76.3	100	50	794	4.43	1.98	6.52	6	.0
August-----	84.6	62.6	73.6	99	48	722	3.73	1.79	5.40	6	.0
September--	76.5	54.6	65.5	94	34	468	3.96	1.76	5.84	6	.0
October----	65.2	43.1	54.1	87	22	194	2.92	1.55	4.31	5	.3
November---	49.6	31.0	40.3	74	6	32	2.43	.80	3.78	4	1.7
December---	34.6	17.5	26.1	62	-13	2	1.39	.58	2.08	3	5.5
Yearly:											
Average---	60.9	40.2	50.6	---	---	---	---	---	---	---	---
Extreme---	107	-24	---	101	-20	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,413	34.11	27.58	39.84	58	23.9

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1961-90 at Sigourney, Iowa)

Probability	Temperature: 24 °F or lower	Temperature: 28 °F or lower	Temperature: 32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 15	Apr. 21	May 4
2 years in 10 later than--	Apr. 11	Apr. 18	Apr. 29
5 years in 10 later than--	Apr. 3	Apr. 10	Apr. 21
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 18	Oct. 8	Sept. 27
2 years in 10 earlier than--	Oct. 24	Oct. 13	Oct. 3
5 years in 10 earlier than--	Nov. 3	Oct. 25	Oct. 14

Table 3.--Growing Season

(Recorded in the period 1961-90 at Sigourney, Iowa)

Probability	Daily minimum temperature during growing season: Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	199	176	156
8 years in 10	204	184	163
5 years in 10	215	197	176
2 years in 10	225	211	189
1 year in 10	231	218	196

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
8B	Judson silty clay loam, 2 to 5 percent slopes	361	*
8C	Judson silty clay loam, 5 to 9 percent slopes	325	*
13B	Olmitz-Vesser-Zook complex, 0 to 5 percent slopes	18,247	4.9
24D2	Shelby clay loam, 9 to 14 percent slopes, moderately eroded	284	*
24E2	Shelby clay loam, 14 to 18 percent slopes, moderately eroded	494	0.1
51	Vesser silt loam, 0 to 2 percent slopes, occasionally flooded	1,657	0.4
51B	Vesser silt loam, 2 to 5 percent slopes, rarely flooded	1,123	0.3
54	Zook silty clay, 0 to 2 percent slopes, occasionally flooded	1,803	0.5
54+	Zook silt loam, 0 to 2 percent slopes, occasionally flooded, overwash	655	0.2
56B	Cantril loam, 2 to 5 percent slopes	621	0.2
56C	Cantril loam, 5 to 9 percent slopes	573	0.2
65D2	Lindley loam, 9 to 14 percent slopes, moderately eroded	148	*
65E	Lindley loam, 14 to 18 percent slopes	1,666	0.4
65E2	Lindley loam, 14 to 18 percent slopes, moderately eroded	7,464	2.0
65F	Lindley loam, 18 to 25 percent slopes	1,928	0.5
65F2	Lindley loam, 18 to 25 percent slopes, moderately eroded	1,621	0.4
65G	Lindley loam, 25 to 40 percent slopes	431	0.1
74	Rubio silt loam, 0 to 2 percent slopes	141	*
75	Givin silt loam, 0 to 2 percent slopes	3,845	1.0
75B	Givin silt loam, 2 to 5 percent slopes	417	0.1
76B	Ladoga silt loam, 2 to 5 percent slopes	18,530	5.0
76B2	Ladoga silty clay loam, 2 to 5 percent slopes, moderately eroded	164	*
76C	Ladoga silt loam, 5 to 9 percent slopes	197	*
76C2	Ladoga silty clay loam, 5 to 9 percent slopes, moderately eroded	29,755	8.0
76D2	Ladoga silty clay loam, 9 to 14 percent slopes, moderately eroded	7,450	2.0
80B	Clinton silt loam, 2 to 5 percent slopes	4,034	1.1
80C	Clinton silt loam, 5 to 9 percent slopes	1,044	0.3
80C2	Clinton silty clay loam, 5 to 9 percent slopes, moderately eroded	17,154	4.6
80D	Clinton silt loam, 9 to 14 percent slopes	918	0.2
80D2	Clinton silty clay loam, 9 to 14 percent slopes, moderately eroded	13,955	3.8
87B	Colo-Zook complex, 0 to 3 percent slopes	292	*
93D2	Shelby-Adair complex, 9 to 14 percent slopes, moderately eroded	2,180	0.6
122	Sperry silt loam, 0 to 1 percent slopes	760	0.2
133	Colo silty clay loam, 0 to 2 percent slopes, occasionally flooded	2,149	0.6
133+	Colo silt loam, 0 to 2 percent slopes, occasionally flooded, overwash	2,013	0.5
133B	Colo silty clay loam, 2 to 5 percent slopes, rarely flooded	837	0.2
163E	Fayette silt loam, 14 to 18 percent slopes	153	*
163E2	Fayette silt loam, 14 to 18 percent slopes, moderately eroded	841	0.2
163F	Fayette silt loam, 18 to 25 percent slopes	308	*
179D2	Gara clay loam, 9 to 14 percent slopes, moderately eroded	599	0.2
179E	Gara loam, 14 to 18 percent slopes	171	*
179E2	Gara clay loam, 14 to 18 percent slopes, moderately eroded	4,590	1.2
179F2	Gara clay loam, 18 to 25 percent slopes, moderately eroded	415	0.1
180	Keomah silt loam, 0 to 2 percent slopes	310	*
220	Nodaway silt loam, 0 to 2 percent slopes, occasionally flooded	2,950	0.8
222C	Clarinda silty clay loam, 5 to 9 percent slopes	154	*
222C2	Clarinda silty clay loam, 5 to 9 percent slopes, moderately eroded	904	0.2
223C2	Rinda silty clay loam, 5 to 9 percent slopes, moderately eroded	691	0.2
273C	Olmitz loam, 5 to 9 percent slopes	507	0.1
279	Taintor silty clay loam, 0 to 2 percent slopes	20,731	5.6
280	Mahaska silty clay loam, 0 to 2 percent slopes	24,891	6.7
280B	Mahaska silty clay loam, 2 to 5 percent slopes	5,628	1.5
281B	Otley silty clay loam, 2 to 5 percent slopes	17,974	4.8
281B2	Otley silty clay loam, 2 to 5 percent slopes, moderately eroded	249	*
281C	Otley silty clay loam, 5 to 9 percent slopes	498	0.1
281C2	Otley silty clay loam, 5 to 9 percent slopes, moderately eroded	7,986	2.2
281D2	Otley silty clay loam, 9 to 14 percent slopes, moderately eroded	191	*
293C	Chelsea-Fayette complex, 5 to 9 percent slopes	521	0.1
293D	Chelsea-Fayette complex, 9 to 14 percent slopes	1,012	0.3
293E	Chelsea-Fayette complex, 14 to 18 percent slopes	569	0.2
293F	Chelsea-Fayette complex, 18 to 25 percent slopes	379	0.1

See footnote at end of table.

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
294C	Billett, loamy substratum-Ladoga, sandy substratum, complex, 5 to 9 percent slopes	693	0.2
294D	Billett, loamy substratum-Ladoga, sandy substratum, complex, 9 to 14 percent slopes	840	0.2
313F2	Gosport silty clay loam, 18 to 25 percent slopes, moderately eroded	69	*
319E	Dunbarton silt loam, 14 to 18 percent slopes	100	*
422	Amana silt loam, 0 to 2 percent slopes, occasionally flooded	2,316	0.6
423D2	Bucknell silty clay loam, 9 to 14 percent slopes, moderately eroded	9,364	2.5
424D	Lindley-Keswick complex, 9 to 14 percent slopes	116	*
424D2	Lindley-Keswick complex, 9 to 14 percent slopes, moderately eroded	7,934	2.1
424E2	Lindley-Keswick complex, 14 to 18 percent slopes, moderately eroded	2,913	0.8
425D	Keswick loam, 9 to 14 percent slopes	344	*
425D2	Keswick clay loam, 9 to 14 percent slopes, moderately eroded	4,109	1.1
428B	Ely silty clay loam, 2 to 5 percent slopes	859	0.2
430	Ackmore silt loam, 0 to 2 percent slopes, occasionally flooded	1,859	0.5
453	Tuskeego silt loam, 0 to 2 percent slopes, occasionally flooded	448	0.1
520	Coppock silt loam, 0 to 2 percent slopes, occasionally flooded	282	*
520B	Coppock silt loam, 2 to 5 percent slopes, rarely flooded	384	0.1
570C	Nira silty clay loam, 5 to 9 percent slopes	1,475	0.4
570C2	Nira silty clay loam, 5 to 9 percent slopes, moderately eroded	7,647	2.1
571C2	Hedrick silty clay loam, 5 to 9 percent slopes, moderately eroded	10,514	2.8
571D2	Hedrick silty clay loam, 9 to 14 percent slopes, moderately eroded	821	0.2
572C2	Inton silty clay loam, 5 to 9 percent slopes, moderately eroded	1,199	0.3
572D2	Inton silty clay loam, 9 to 14 percent slopes, moderately eroded	932	0.3
587	Chequest silty clay loam, 0 to 2 percent slopes, occasionally flooded	1,735	0.5
587+	Chequest silt loam, 0 to 2 percent slopes, occasionally flooded, overwash	205	*
687B	Watkins silt loam, 2 to 5 percent slopes	333	*
688	Koszta silt loam, 0 to 2 percent slopes	720	0.2
722	Nodaway-Ackmore-Vesser complex, 0 to 2 percent slopes, occasionally flooded	7,757	2.1
730B	Nodaway, occasionally flooded-Coppock-Cantril, rarely flooded, complex, 2 to 5 percent slopes	9,882	2.7
779	Kalona silty clay loam, 0 to 2 percent slopes	135	*
792C2	Armstrong clay loam, 5 to 9 percent slopes, moderately eroded	2	*
792D2	Armstrong clay loam, 9 to 14 percent slopes, moderately eroded	837	0.2
795C2	Ashgrove silty clay loam, 5 to 9 percent slopes, moderately eroded	11	*
795D2	Ashgrove silty clay loam, 9 to 14 percent slopes, moderately eroded	1,508	0.4
822D2	Lamoni silty clay loam, 9 to 14 percent slopes, moderately eroded	3,967	1.1
876B	Ladoga silt loam, terrace, 2 to 5 percent slopes	937	0.3
876C2	Ladoga silty clay loam, terrace, 5 to 9 percent slopes, moderately eroded	893	0.2
876D2	Ladoga silty clay loam, terrace, 9 to 14 percent slopes, moderately eroded	158	*
880B	Clinton silt loam, terrace, 2 to 5 percent slopes	321	*
880C2	Clinton silty clay loam, terrace, 5 to 9 percent slopes, moderately eroded	1,342	0.4
880D2	Clinton silty clay loam, terrace, 9 to 14 percent slopes, moderately eroded	726	0.2
881B	Otley silty clay loam, terrace, 2 to 5 percent slopes	214	*
911B	Colo-Ely complex, 2 to 5 percent slopes	2,796	0.8
993D2	Gara-Armstrong complex, 9 to 14 percent slopes, moderately eroded	17,981	4.8
993E2	Gara-Armstrong complex, 14 to 18 percent slopes, moderately eroded	1,173	0.3
994D2	Galland-Douds complex, 9 to 14 percent slopes, moderately eroded	282	*
994E2	Galland-Douds complex, 14 to 18 percent slopes, moderately eroded	90	*
999F	Nordness-Eleva complex, 18 to 25 percent slopes	248	*
999G	Nordness-Eleva complex, 25 to 40 percent slopes	813	0.2
1075	Givin silt loam, terrace, 0 to 2 percent slopes	667	0.2
1220	Nodaway silt loam, channeled, 0 to 2 percent slopes, frequently flooded	6,561	1.8
1279	Taintor silty clay loam, terrace, 0 to 2 percent slopes	327	*
1280	Mahaska silty clay loam, terrace, 0 to 2 percent slopes	363	*
1315	Nodaway-Klum complex, channeled, 0 to 2 percent slopes, frequently flooded	1,468	0.4
5010	Pits, sand and gravel	3	*
5020	Pits and Dumps	53	*

See footnote at end of table.

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
5030	Pits, limestone quarries	520	0.1
5040	Orthents, loamy	249	*
5048	Aquents, ponded, frequently flooded	100	*
5060	Pits, clay	164	*
5080	Orthents, sanitary landfill	52	*
6051	Vesser silt loam, 0 to 2 percent slopes, frequently flooded	246	*
6054	Zook silty clay loam, 0 to 2 percent slopes, frequently flooded	251	*
6133	Colo silty clay loam, 0 to 2 percent slopes, frequently flooded	169	*
6133+	Colo silt loam, 0 to 2 percent slopes, frequently flooded, overwash	467	0.1
6220	Nodaway silt loam, 0 to 2 percent slopes, frequently flooded	6,473	1.7
6315	Nodaway-Klum complex, 0 to 2 percent slopes, frequently flooded	657	0.2
6422	Amana silt loam, 0 to 2 percent slopes, frequently flooded	1,093	0.3
6587	Chequest silty clay loam, 0 to 2 percent slopes, frequently flooded	342	*
AW	Animal waste	6	*
SL	Sewage lagoon	27	*
W	Water	2,300	0.6
	Total	371,300	100.0

* Less than 0.1 percent.

Table 5.--Cropland Management Considerations

(See text for a description of the considerations listed in this table.)

Map symbol and soil name	Percent of map unit	Cropland management considerations
8B:		
Judson	95	Potential poor tilth and compaction Potential for surface-water contamination Water erosion
8C:		
Judson	95	Potential poor tilth and compaction Potential for surface-water contamination Water erosion
13B:		
Olmitz	30	Potential for ground-water contamination Potential for surface-water contamination Water erosion
Vesser	28	Acid soil Potential for ground-water contamination Potential for surface-water contamination Water erosion Seasonal high water table
Zook	27	Flooding Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Seasonal high water table
24D2:		
Shelby	95	Potential poor tilth and compaction Potential for surface-water contamination Previously eroded Water erosion
24E2:		
Shelby	90	Slope Potential poor tilth and compaction Potential for surface-water contamination Previously eroded Water erosion
51:		
Vesser	90	Acid soil Flooding Potential for ground-water contamination Potential for surface-water contamination Seasonal high water table
51B:		
Vesser	95	Acid soil Potential for ground-water contamination Potential for surface-water contamination Water erosion Seasonal high water table
54:		
Zook	90	Flooding Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Seasonal high water table

Table 5.--Cropland Management Considerations--Continued

Map symbol and soil name	Percent of map unit	Cropland management considerations
54+:		
Zook	90	Flooding Potential for ground-water contamination Potential for surface-water contamination Seasonal high water table
56B:		
Cantril	90	Potential for ground-water contamination Potential for surface-water contamination Water erosion Seasonal high water table
56C:		
Cantril	90	Potential for ground-water contamination Potential for surface-water contamination Water erosion Seasonal high water table
65D2:		
Lindley	95	Potential for surface-water contamination Previously eroded Water erosion
65E:		
Lindley	95	Slope Potential for surface-water contamination Water erosion
65E2:		
Lindley	90	Slope Potential for surface-water contamination Previously eroded Water erosion
65F:		
Lindley	90	Slope Potential for surface-water contamination Water erosion
65F2:		
Lindley	90	Slope Potential for surface-water contamination Previously eroded Water erosion
65G:		
Lindley	95	Slope Potential for surface-water contamination Water erosion
74:		
Rubio	95	Acid soil Potential for ground-water contamination Seasonal high water table
75:		
Givin	95	Acid soil Potential for ground-water contamination Seasonal high water table

Table 5.--Cropland Management Considerations--Continued

Map symbol and soil name	Percent of map unit	Cropland management considerations
75B:		
Givin	95	Acid soil Potential for ground-water contamination Potential for surface-water contamination Water erosion Seasonal high water table
76B:		
Ladoga	95	Acid soil Potential for ground-water contamination Potential for surface-water contamination Water erosion
76B2:		
Ladoga	90	Acid soil Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion
76C:		
Ladoga	95	Acid soil Potential for ground-water contamination Potential for surface-water contamination Water erosion
76C2:		
Ladoga	90	Acid soil Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion
76D2:		
Ladoga	90	Acid soil Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion
80B:		
Clinton	95	Acid soil Potential for ground-water contamination Potential for surface-water contamination Water erosion
80C:		
Clinton	95	Acid soil Potential for ground-water contamination Potential for surface-water contamination Water erosion
80C2:		
Clinton	90	Acid soil Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion

Table 5.--Cropland Management Considerations--Continued

Map symbol and soil name	Percent of map unit	Cropland management considerations
80D:		
Clinton	90	Acid soil Potential for ground-water contamination Potential for surface-water contamination Water erosion
80D2:		
Clinton	90	Acid soil Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion
87B:		
Colo	68	Flooding Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Seasonal high water table
Zook	32	Flooding Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Seasonal high water table
93D2:		
Shelby	60	Potential poor tilth and compaction Potential for surface-water contamination Previously eroded Water erosion
Adair	40	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion Seasonal high water table
122:		
Sperry	95	Ponding Potential for ground-water contamination Potential for surface-water contamination Seasonal high water table
133:		
Colo	95	Flooding Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Seasonal high water table
133+:		
Colo	90	Flooding Potential for ground-water contamination Potential for surface-water contamination Seasonal high water table
133B:		
Colo	90	Potential poor tilth and compaction Potential for ground-water contamination Water erosion Seasonal high water table

Table 5.--Cropland Management Considerations--Continued

Map symbol and soil name	Percent of map unit	Cropland management considerations
163E:		
Fayette	90	Slope Potential for surface-water contamination Water erosion
163E2:		
Fayette	90	Acid soil Slope Potential for surface-water contamination Previously eroded Water erosion
163F:		
Fayette	90	Slope Potential for surface-water contamination Water erosion
179D2:		
Gara	90	Potential poor tilth and compaction Potential for surface-water contamination Previously eroded Water erosion
179E:		
Gara	95	Slope Potential for surface-water contamination Water erosion
179E2:		
Gara	90	Slope Potential poor tilth and compaction Potential for surface-water contamination Previously eroded Water erosion
179F2:		
Gara	95	Slope Potential poor tilth and compaction Potential for surface-water contamination Previously eroded Water erosion
180:		
Keomah	95	Acid soil Potential for ground-water contamination Seasonal high water table
220:		
Nodaway	90	Flooding Potential for ground-water contamination Potential for surface-water contamination
222C:		
Clarinda	90	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Restricted permeability Water erosion Seasonal high water table

Table 5.--Cropland Management Considerations--Continued

Map symbol and soil name	Percent of map unit	Cropland management considerations
222C2:		
Clarinda	90	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Seasonal high water table
223C2:		
Rinda	90	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Seasonal high water table
273C:		
Olmitz	95	Potential for ground-water contamination Potential for surface-water contamination Water erosion
279:		
Taintor	95	Potential poor tilth and compaction Potential for ground-water contamination Seasonal high water table
280:		
Mahaska	95	Acid soil Potential poor tilth and compaction Potential for ground-water contamination Seasonal high water table
280B:		
Mahaska	90	Acid soil Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Water erosion Seasonal high water table
281B:		
Otley	90	Acid soil Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Water erosion Seasonal high water table
281B2:		
Otley	90	Acid soil Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion Seasonal high water table

Table 5.--Cropland Management Considerations--Continued

Map symbol and soil name	Percent of map unit	Cropland management considerations
281C:		
Otley	95	Acid soil Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Water erosion Seasonal high water table
281C2:		
Otley	90	Acid soil Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion Seasonal high water table
281D2:		
Otley	90	Acid soil Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion Seasonal high water table
293C:		
Chelsea	57	Excessive permeability Limited available water capacity Limited content of organic matter Potential for ground-water contamination Potential for surface-water contamination Wind erosion
Fayette	38	Potential for surface-water contamination Water erosion
293D:		
Chelsea	57	Excessive permeability Limited available water capacity Limited content of organic matter Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
Fayette	38	Potential for surface-water contamination Water erosion
293E:		
Chelsea	57	Slope Excessive permeability Limited available water capacity Limited content of organic matter Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
Fayette	38	Slope Potential for surface-water contamination Water erosion

Table 5.--Cropland Management Considerations--Continued

Map symbol and soil name	Percent of map unit	Cropland management considerations
293F:		
Chelsea	57	Slope Excessive permeability Limited available water capacity Limited content of organic matter Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
Fayette	38	Slope Potential for surface-water contamination Water erosion
294C:		
Billett	65	Limited content of organic matter Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
Ladoga	35	Potential for ground-water contamination Potential for surface-water contamination Water erosion
294D:		
Billett	65	Limited content of organic matter Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
Ladoga	35	Potential for ground-water contamination Potential for surface-water contamination Water erosion
313F2:		
Gosport	95	Acid soil Slope Depth to bedrock Limited available water capacity Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Seasonal high water table
319E:		
Dunbarton	95	Slope Depth to bedrock Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion
422:		
Amana	90	Flooding Potential for ground-water contamination Potential for surface-water contamination Seasonal high water table

Table 5.--Cropland Management Considerations--Continued

Map symbol and soil name	Percent of map unit	Cropland management considerations
423D2:		
Bucknell	90	Acid soil Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Seasonal high water table
424D:		
Lindley	52	Potential for surface-water contamination Water erosion
Keswick	43	Acid soil Potential for ground-water contamination Potential for surface-water contamination Water erosion Seasonal high water table
424D2:		
Lindley	52	Potential for surface-water contamination Previously eroded Water erosion
Keswick	43	Acid soil Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion Seasonal high water table
424E2:		
Lindley	48	Slope Potential for surface-water contamination Previously eroded Water erosion
Keswick	42	Acid soil Slope Limited content of organic matter Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Surface crusting Water erosion Seasonal high water table
425D:		
Keswick	90	Acid soil Potential for ground-water contamination Potential for surface-water contamination Water erosion Seasonal high water table
425D2:		
Keswick	90	Acid soil Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion Seasonal high water table

Table 5.--Cropland Management Considerations--Continued

Map symbol and soil name	Percent of map unit	Cropland management considerations
428B:		
Ely	95	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Water erosion Seasonal high water table
430:		
Ackmore	90	Flooding Potential for ground-water contamination Potential for surface-water contamination Seasonal high water table
453:		
Tuskeego	95	Flooding Potential for ground-water contamination Potential for surface-water contamination Restricted permeability Seasonal high water table
520:		
Coppock	95	Acid soil Flooding Potential for ground-water contamination Potential for surface-water contamination Seasonal high water table
520B:		
Coppock	95	Acid soil Potential for ground-water contamination Potential for surface-water contamination Water erosion Seasonal high water table
570C:		
Nira	95	Acid soil Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Water erosion Seasonal high water table
570C2:		
Nira	95	Acid soil Potential poor tilth and compaction Potential for ground-water contamination Previously eroded Water erosion Seasonal high water table
571C2:		
Hedrick	89	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Water erosion Seasonal high water table

Table 5.--Cropland Management Considerations--Continued

Map symbol and soil name	Percent of map unit	Cropland management considerations
571D2:		
Hedrick	95	Potential poor tilth and compaction
		Potential for ground-water contamination
		Potential for surface-water contamination
		Previously eroded
		Restricted permeability
		Water erosion
		Seasonal high water table
572C2:		
Inton	90	Limited content of organic matter
		Potential poor tilth and compaction
		Potential for ground-water contamination
		Potential for surface-water contamination
		Previously eroded
		Restricted permeability
		Surface crusting
		Water erosion
		Seasonal high water table
572D2:		
Inton	90	Potential poor tilth and compaction
		Potential for ground-water contamination
		Potential for surface-water contamination
		Previously eroded
		Restricted permeability
		Water erosion
		Seasonal high water table
587:		
Chequest	90	Acid soil
		Flooding
		Potential poor tilth and compaction
		Potential for ground-water contamination
		Potential for surface-water contamination
		Seasonal high water table
587+:		
Chequest	90	Acid soil
		Flooding
		Potential for ground-water contamination
		Potential for surface-water contamination
		Seasonal high water table
687B:		
Watkins	90	Potential for surface-water contamination
		Water erosion
688:		
Koszta	90	Potential for ground-water contamination
		Seasonal high water table
722:		
Nodaway	36	Flooding
		Potential for ground-water contamination
		Potential for surface-water contamination
Ackmore	32	Flooding
		Potential for ground-water contamination
		Potential for surface-water contamination
		Seasonal high water table

Table 5.--Cropland Management Considerations--Continued

Map symbol and soil name	Percent of map unit	Cropland management considerations
722:		
Vesser	22	Acid soil Flooding Potential for ground-water contamination Potential for surface-water contamination Seasonal high water table
730B:		
Nodaway	46	Flooding Potential for ground-water contamination Potential for surface-water contamination
Coppock	27	Acid soil Potential for ground-water contamination Potential for surface-water contamination Water erosion Seasonal high water table
Cantril	17	Potential for ground-water contamination Potential for surface-water contamination Water erosion Seasonal high water table
779:		
Kalona	95	Potential poor tilth and compaction Potential for ground-water contamination Seasonal high water table
792C2:		
Armstrong	90	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion Seasonal high water table
792D2:		
Armstrong	95	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion Seasonal high water table
795C2:		
Ashgrove	95	Limited content of organic matter Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Surface crusting Water erosion Seasonal high water table
795D2:		
Ashgrove	82	Limited content of organic matter Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Restricted permeability Surface crusting Water erosion Seasonal high water table

Table 5.--Cropland Management Considerations--Continued

Map symbol and soil name	Percent of map unit	Cropland management considerations
822D2:		
Lamoni	90	Potential poor tilth and compaction
		Potential for ground-water contamination
		Potential for surface-water contamination
		Previously eroded
		Restricted permeability
		Water erosion
		Seasonal high water table
876B:		
Ladoga	90	Acid soil
		Potential for ground-water contamination
		Potential for surface-water contamination
		Water erosion
876C2:		
Ladoga	90	Acid soil
		Potential poor tilth and compaction
		Potential for ground-water contamination
		Potential for surface-water contamination
		Previously eroded
		Water erosion
876D2:		
Ladoga	90	Acid soil
		Potential poor tilth and compaction
		Potential for ground-water contamination
		Potential for surface-water contamination
		Previously eroded
		Water erosion
880B:		
Clinton	95	Acid soil
		Potential for ground-water contamination
		Potential for surface-water contamination
		Water erosion
880C2:		
Clinton	95	Acid soil
		Potential poor tilth and compaction
		Potential for ground-water contamination
		Potential for surface-water contamination
		Previously eroded
		Water erosion
880D2:		
Clinton	95	Acid soil
		Potential poor tilth and compaction
		Potential for ground-water contamination
		Potential for surface-water contamination
		Previously eroded
		Water erosion
881B:		
Otley	95	Acid soil
		Potential poor tilth and compaction
		Potential for ground-water contamination
		Potential for surface-water contamination
		Water erosion
		Seasonal high water table

Table 5.--Cropland Management Considerations--Continued

Map symbol and soil name	Percent of map unit	Cropland management considerations
911B:		
Colo	57	Flooding Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Water erosion Seasonal high water table
Ely	38	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Water erosion Seasonal high water table
993D2:		
Gara	48	Potential poor tilth and compaction Potential for surface-water contamination Previously eroded Water erosion
Armstrong	42	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion Seasonal high water table
993E2:		
Gara	48	Slope Potential poor tilth and compaction Potential for surface-water contamination Previously eroded Water erosion
Armstrong	42	Slope Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion Seasonal high water table
994D2:		
Galland	65	Acid soil Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion Seasonal high water table
Douds	25	Acid soil Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion

Table 5.--Cropland Management Considerations--Continued

Map symbol and soil name	Percent of map unit	Cropland management considerations
994E2:		
Galland	55	Acid soil Slope Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion Seasonal high water table
Douds	35	Acid soil Slope Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion
999F:		
Nordness	62	Slope Depth to bedrock Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Restricted permeability Water erosion
Eleva	23	Slope Depth to bedrock Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Restricted permeability Water erosion Wind erosion
999G:		
Nordness	62	Slope Depth to bedrock Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Restricted permeability Water erosion
Eleva	23	Slope Depth to bedrock Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Restricted permeability Water erosion Wind erosion
1075:		
Givin	90	Acid soil Potential for ground-water contamination Seasonal high water table
1220:		
Nodaway	90	Flooding Channeled Potential for ground-water contamination Potential for surface-water contamination

Table 5.--Cropland Management Considerations--Continued

Map symbol and soil name	Percent of map unit	Cropland management considerations
1279:		
Taintor	95	Potential poor tilth and compaction Potential for ground-water contamination Seasonal high water table
1280:		
Mahaska	95	Acid soil Potential poor tilth and compaction Potential for ground-water contamination Seasonal high water table
1315:		
Nodaway	57	Flooding Channeled Potential for ground-water contamination Potential for surface-water contamination
Klum	38	Flooding Channeled Potential for ground-water contamination Potential for surface-water contamination Wind erosion
5010:		
Pits, sand and gravel.		
5020:		
Pits and Dumps.		
5030:		
Pits, limestone quarries.		
5040:		
Orthents	100	Potential for ground-water contamination Water erosion Wind erosion
5048:		
Aquents, ponded, frequently flooded.		
5060:		
Pits, clay.		
5080:		
Orthents, sanitary landfill	100	Onsite investigation required
6051:		
Vesser	93	Acid soil Flooding Potential for ground-water contamination Potential for surface-water contamination Seasonal high water table
6054:		
Zook	95	Flooding Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Seasonal high water table

Table 5.--Cropland Management Considerations--Continued

Map symbol and soil name	Percent of map unit	Cropland management considerations
6133:		
Colo	90	Flooding Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Seasonal high water table
6133+:		
Colo	90	Flooding Potential for ground-water contamination Potential for surface-water contamination Seasonal high water table
6220:		
Nodaway	90	Flooding Potential for ground-water contamination Potential for surface-water contamination
6315:		
Nodaway	57	Flooding Potential for ground-water contamination Potential for surface-water contamination
Klum	38	Flooding Potential for ground-water contamination Potential for surface-water contamination Wind erosion
6422:		
Amana	89	Flooding Potential for ground-water contamination Potential for surface-water contamination Seasonal high water table
6587:		
Chequest	90	Acid soil Flooding Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Seasonal high water table
AW: Animal waste.		
SL: Sewage lagoon.		
W: Water.		

Table 6.--Land Capability, Corn Suitability Rating, Subsoil Phosphorus, Subsoil Potassium, and Yields per Acre of Crops

(See text for definitions of terms used in this table. Yields are those that can be expected under a high level of management. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil.)

Map symbol and soil name	Percent of map unit	Land capability	Corn suitability rating	Subsoil phosphorus	Subsoil potassium	Corn	Oats	Soybeans
						Bu	Bu	Bu
8B----------------------- Judson	95	2e	90	High	High	159	87	53
8C----------------------- Judson	95	3e	75	High	High	154	85	52
13B----------------------			60	Low	Low	137	75	46
Olmitz------------------	30	2e						
Vesser------------------	28	2w						
Zook--------------------	27	2w						
24D2--------------------- Shelby	95	3e	48	Low	Low	115	63	39
24E2--------------------- Shelby	90	4e	38	Low	Low	98	54	33
51----------------------- Vesser	90	2w	70	High	Low	130	72	44
51B---------------------- Vesser	95	2w	65	High	Low	127	70	43
54----------------------- Zook	90	2w	70	High	High	126	69	42
54+---------------------- Zook	90	2w	75	High	High	131	72	44
56B---------------------- Cantril	90	2e	67	Low	Low	113	62	38
56C---------------------- Cantril	90	2e	52	Low	Low	108	59	36
65D2--------------------- Lindley	95	4e	38	Low	Low	97	53	32
65E---------------------- Lindley	95	6e	30	High	Low	---	---	---

Table 6.--Land Capability, Corn Suitability Rating, Subsoil Phosphorus, Subsoil Potassium, and Yields per Acre of Crops--Continued

Map symbol and soil name	Percent of map unit	Land capability	Corn suitability rating	Subsoil phosphorus	Subsoil potassium	Corn	Oats	Soybeans
						Bu	Bu	Bu
65E2--------------------- Lindley	90	6e	28	High	Low	---	---	---
65F---------------------- Lindley	90	7e	10	High	Low	---	---	---
65F2--------------------- Lindley	90	7e	8	High	Low	---	---	---
65G---------------------- Lindley	95	7e	5	High	Low	---	---	---
74----------------------- Rubio	95	3w	78	High	High	138	76	46
75----------------------- Givin	95	1	85	High	High	148	81	50
75B---------------------- Givin	95	2e	81	High	High	145	80	49
76B---------------------- Ladoga	95	2e	85	High	High	148	81	50
76B2--------------------- Ladoga	90	2e	80	High	High	144	79	48
76C---------------------- Ladoga	95	3e	70	High	Low	143	79	48
76C2--------------------- Ladoga	90	3e	65	High	High	139	76	47
76D2--------------------- Ladoga	90	3e	55	High	High	130	72	44
80B---------------------- Clinton	95	2e	80	High	High	139	76	47
80C---------------------- Clinton	95	3e	65	High	High	134	74	45
80C2--------------------- Clinton	90	3e	60	High	High	130	72	44

Table 6.--Land Capability, Corn Suitability Rating, Subsoil Phosphorus, Subsoil Potassium, and Yields per Acre of Crops--Continued

Map symbol and soil name	Percent of map unit	Land capability	Corn suitability rating	Subsoil phosphorus	Subsoil potassium	Corn	Oats	Soybeans
						Bu	Bu	Bu
80D---------------------- Clinton	90	3e	55	High	High	125	69	42
80D2--------------------- Clinton	90	3e	50	High	High	121	67	41
87B----------------------			60	High	High	133	73	45
Colo--------------------	68	2w						
Zook--------------------	32	2w						
93D2---------------------			35	High	Low	115	63	39
Shelby------------------	60	3e						
Adair-------------------	40	4e						
122---------------------- Sperry	95	3w	63	High	High	124	68	42
133---------------------- Colo	95	2w	80	High	High	136	75	46
133+--------------------- Colo	90	2w	85	High	Low	140	77	47
133B--------------------- Colo	90	2w	75	High	Low	136	75	46
163E--------------------- Fayette	90	4e	50	High	High	118	65	40
163E2-------------------- Fayette	90	4e	48	High	High	114	63	38
163F--------------------- Fayette	90	6e	30	High	High	---	---	---
179D2-------------------- Gara	90	4e	43	High	Low	106	58	36
179E--------------------- Gara	95	6e	35	High	Low	---	---	---
179E2-------------------- Gara	90	6e	33	High	Low	---	---	---

Table 6.--Land Capability, Corn Suitability Rating, Subsoil Phosphorus, Subsoil Potassium, and Yields per Acre of Crops--Continued

Map symbol and soil name	Percent of map unit	Land capability	Corn suitability rating	Subsoil phosphorus	Subsoil potassium	Corn	Oats	Soybeans
						Bu	Bu	Bu
179F2-------------------- Gara	95	7e	13	High	Low	---	---	---
180--------------------- Keomah	95	2w	76	High	Low	131	72	44
220--------------------- Nodaway	90	2w	87	High	Low	153	84	51
222C-------------------- Clarinda	90	4w	30	Low	Low	82	45	27
222C2------------------- Clarinda	90	4w	25	Low	Low	72	40	24
223C2------------------- Rinda	90	4w	22	Low	Low	63	35	21
273C-------------------- Olmitz	95	3e	57	Low	High	132	73	44
279--------------------- Taintor	95	2w	88	Low	High	155	85	52
280--------------------- Mahaska	95	1	95	Low	Low	165	91	55
280B-------------------- Mahaska	90	2e	90	High	Low	162	89	54
281B-------------------- Otley	90	2e	90	High	Low	157	86	53
281B2------------------- Otley	90	2e	85	High	Low	153	84	51
281C-------------------- Otley	95	3e	75	High	Low	152	84	51
281C2------------------- Otley	90	3e	70	High	Low	148	81	50
281D2------------------- Otley	90	3e	60	High	Low	139	76	47

Table 6.--Land Capability, Corn Suitability Rating, Subsoil Phosphorus, Subsoil Potassium, and Yields per Acre of Crops--Continued

Map symbol and soil name	Percent of map unit	Land capability	Corn suitability rating	Subsoil phosphorus	Subsoil potassium	Corn	Oats	Soybeans
						Bu	Bu	Bu
293C			41	Low	Low	87	48	29
Chelsea	57	4s						
Fayette	38	3e						
293D			31	Low	Low	78	43	26
Chelsea	57	6s						
Fayette	38	3e						
293E			23	Low	Low	---	---	---
Chelsea	57	7s						
Fayette	38	4e						
293F			15	Low	Low	---	---	---
Chelsea	57	7s						
Fayette	38	6e						
294C			48	High	Low	112	62	38
Billett	65	3e						
Ladoga	35	3e						
294D			38	High	Low	103	57	35
Billett	65	4e						
Ladoga	35	3e						
313F2 Gosport	95	7e	5	Low	Low	---	---	---
319E Dunbarton	95	6e	5	Low	Low	---	---	---
422 Amana	90	2w	85	High	Low	145	80	49
423D2 Bucknell	90	4e	13	Low	Low	64	35	21
424D			20	Low	Low	92	51	31
Lindley	52	4e						
Keswick	43	4e						
424D2			15	Low	Low	87	48	29
Lindley	52	4e						
Keswick	43	4e						

Table 6.--Land Capability, Corn Suitability Rating, Subsoil Phosphorus, Subsoil Potassium, and Yields per Acre of Crops--Continued

Map symbol and soil name	Percent of map unit	Land capability	Corn suitability rating	Subsoil phosphorus	Subsoil potassium	Corn	Oats	Soybeans
						Bu	Bu	Bu
424E2			5	Low	Low	---	---	---
Lindley	48	6e						
Keswick	42	6e						
425D Keswick	90	4e	16	Low	Low	65	36	22
425D2 Keswick	90	4e	12	Low	Low	55	30	18
428B Ely	95	2e	88	High	Low	159	87	53
430 Ackmore	90	2w	83	High	Low	141	78	47
453 Tuskeego	95	3w	53	High	Low	105	58	35
520 Coppock	95	2w	65	High	High	121	67	41
520B Coppock	95	2w	60	High	High	118	65	40
570C Nira	95	3e	72	High	High	147	81	49
570C2 Nira	95	3e	67	High	High	147	81	49
571C2 Hedrick	89	3e	62	High	High	128	70	43
571D2 Hedrick	95	3e	52	High	High	119	65	40
572C2 Inton	90	3e	57	High	High	125	69	42
572D2 Inton	90	3e	47	High	High	116	64	39
587 Chequest	90	2w	65	High	High	120	66	40

Table 6.--Land Capability, Corn Suitability Rating, Subsoil Phosphorus, Subsoil Potassium, and Yields per Acre of Crops--Continued

Map symbol and soil name	Percent of map unit	Land capability	Corn suitability rating	Subsoil phosphorus	Subsoil potassium	Corn	Oats	Soybeans
						Bu	Bu	Bu
587+ Chequest	90	2w	67	High	High	124	68	42
687B Watkins	90	2e	80	High	High	151	83	51
688 Koszta	90	1	85	High	High	154	85	52
722			80	Low	Low	153	84	51
Nodaway	36	2w						
Ackmore	32	2w						
Vesser	22	2w						
730B			61	Low	Low	153	84	51
Nodaway	46	2w						
Coppock	27	2w						
Cantril	17	2e						
779 Kalona	95	2w	85	Low	Low	152	84	51
792C2 Armstrong	90	3e	27	Low	Low	73	40	24
792D2 Armstrong	95	4e	13	Low	High	62	34	21
795C2 Ashgrove	95	4e	15	Low	Low	---	---	---
795D2 Ashgrove	82	4e	8	Low	High	---	---	---
822D2 Lamoni	90	4e	15	Low	High	73	40	24
876B Ladoga	90	2e	85	High	High	148	81	50
876C2 Ladoga	90	3e	65	High	High	139	76	47
876D2 Ladoga	90	3e	55	High	High	130	72	44

Table 6.--Land Capability, Corn Suitability Rating, Subsoil Phosphorus, Subsoil Potassium, and Yields per Acre of Crops--Continued

Map symbol and soil name	Percent of map unit	Land capability	Corn suitability rating	Subsoil phosphorus	Subsoil potassium	Corn	Oats	Soybeans
						Bu	Bu	Bu
880B--------------------- Clinton	95	2e	80	High	High	135	74	45
880C2-------------------- Clinton	95	3e	60	High	High	130	72	44
880D2-------------------- Clinton	95	3e	50	High	High	121	67	41
881B--------------------- Otley	95	2e	90	High	High	157	86	53
911B---------------------			68	High	Low	133	73	45
Colo---------------------	57	2w						
Ely----------------------	38	2e						
993D2--------------------			20	Low	Low	106	58	36
Gara---------------------	48	4e						
Armstrong----------------	42	4e						
993E2--------------------			10	Low	Low	---	---	---
Gara---------------------	48	6e						
Armstrong----------------	42	6e						
994D2--------------------			12	Low	Low	54	30	18
Galland------------------	65	4e						
Douds--------------------	25	4e						
994E2--------------------			5	Low	Low	34	---	---
Galland------------------	55	6e						
Douds--------------------	35	6e						
999F---------------------			5	Low	Low	---	---	---
Nordness-----------------	62	7s						
Eleva--------------------	23	7s						
999G---------------------			5	Low	Low	---	---	---
Nordness-----------------	62	7s						
Eleva--------------------	23	7s						
1075--------------------- Givin	90	1	85	Low	High	148	81	50
1220--------------------- Nodaway	90	5w	25	High	High	---	---	---

Table 6.--Land Capability, Corn Suitability Rating, Subsoil Phosphorus, Subsoil Potassium, and Yields per Acre of Crops--Continued

Map symbol and soil name	Percent of map unit	Land capability	Corn suitability rating	Subsoil phosphorus	Subsoil potassium	Corn	Oats	Soybeans
						Bu	Bu	Bu
1279 Taintor	95	2w	88	High	High	155	85	52
1280 Mahaska	95	1	95	High	High	165	91	55
1315			25	Low	Low	---	---	---
Nodaway	57	5w						
Klum	38	5w						
5010 Pits, sand and gravel	100	8s	---	---	---	---	---	---
5020 Pits and Dumps	100	8s	---	---	---	---	---	---
5030 Pits, limestone quarries	100	8s	---	---	---	---	---	---
5040. Orthents, loamy								
5048 Aquents	100	7w	---	---	---	---	---	---
5060. Pits, clay								
5080. Orthents, sanitary landfill								
6051 Vesser	93	3w	42	High	Low	---	---	---
6054 Zook	95	4w	28	High	High	---	---	---
6133 Colo	90	4w	32	High	Low	---	---	---
6133+ Colo	90	4w	34	High	Low	---	---	---

Table 6.--Land Capability, Corn Suitability Rating, Subsoil Phosphorus, Subsoil Potassium, and Yields per Acre of Crops--Continued

Map symbol and soil name	Percent of map unit	Land capability	Corn suitability rating	Subsoil phosphorus	Subsoil potassium	Corn	Oats	Soybeans
						Bu	Bu	Bu
6220--------------------- Nodaway	90	4w	35	High	Low	---	---	---
6315---------------------			28	Low	Low	---	---	---
Nodaway-----------------	57	4w						
Klum--------------------	38	4w						
6422--------------------- Amana	89	3w	51	Low	Low	---	---	---
6587--------------------- Chequest	90	4w	27	High	High	---	---	---
AW. Animal waste								
SL. Sewage lagoon								
W. Water								

Table 7.--Land Capability and Yields per Acre of Pasture

(Yields are those that can be expected under a high level of management. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil.)

Map symbol and soil name	Percent of map unit	Land capability	Bromegrass-alfalfa hay	Kentucky bluegrass	Smooth bromegrass
			Tons	AUM*	AUM*
8B----------------------- Judson	95	2e	6.7	3.9	6.5
8C----------------------- Judson	95	3e	6.5	3.8	6.3
13B----------------------			5.8	3.4	5.6
Olmitz------------------	30	2e			
Vesser------------------	28	2w			
Zook--------------------	27	2w			
24D2--------------------- Shelby	95	3e	4.8	2.8	4.7
24E2--------------------- Shelby	90	4e	4.1	2.4	4.0
51----------------------- Vesser	90	2w	5.2	3.2	5.3
51B---------------------- Vesser	95	2w	5.1	3.1	5.2
54----------------------- Zook	90	2w	3.8	3.1	5.2
54+---------------------- Zook	90	2w	3.9	3.2	5.2
56B---------------------- Cantril	90	2e	4.5	2.8	4.6
56C---------------------- Cantril	90	2e	4.3	2.7	4.4
65D2--------------------- Lindley	95	4e	4.2	2.4	4.0
65E---------------------- Lindley	95	6e	3.5	2.1	3.4
65E2--------------------- Lindley	90	6e	3.3	2.0	3.3
65F---------------------- Lindley	90	7e	3.0	1.8	3.0
65F2--------------------- Lindley	90	7e	2.9	1.7	2.9
65G---------------------- Lindley	95	7e	2.8	1.7	2.8
74----------------------- Rubio	95	3w	4.1	3.4	5.7

See footnote at end of table.

Table 7.--Land Capability and Yields per Acre of Pasture--Continued

Map symbol and soil name	Percent of map unit	Land capability	Bromegrass-alfalfa hay	Kentucky bluegrass	Smooth bromegrass
			Tons	AUM*	AUM*
75: Givin	95	1	5.9	3.6	6.1
75B: Givin	95	2e	5.8	3.6	5.9
76B: Ladoga	95	2e	6.2	3.6	6.1
76B2: Ladoga	90	2e	6.0	3.5	5.9
76C: Ladoga	95	3e	6.0	3.5	5.9
76C2: Ladoga	90	3e	5.8	3.4	5.7
76D2: Ladoga	90	3e	5.5	3.2	5.3
80B: Clinton	95	2e	5.8	3.4	5.7
80C: Clinton	95	3e	5.6	3.3	5.5
80C2: Clinton	90	3e	5.5	3.2	5.3
80D: Clinton	90	3e	5.3	3.1	5.1
80D2: Clinton	90	3e	5.1	3.0	5.0
87B:			4.0	3.3	5.5
Colo	68	2w			
Zook	32	2w			
93D2:			4.6	2.8	4.7
Shelby	60	3e			
Adair	40	4e			
122: Sperry	95	3w	3.7	3.1	5.1
133: Colo	95	2w	4.1	3.3	5.6
133+: Colo	90	2w	4.2	3.4	5.7
133B: Colo	90	2w	4.1	3.3	5.6
163E: Fayette	90	4e	5.0	2.9	4.8
163E2: Fayette	90	4e	4.8	2.8	4.7

See footnote at end of table.

Table 7.--Land Capability and Yields per Acre of Pasture--Continued

Map symbol and soil name	Percent of map unit	Land capability	Bromegrass-alfalfa hay	Kentucky bluegrass	Smooth bromegrass
			Tons	AUM*	AUM*
163F--------------------- Fayette	90	6e	---	2.8	4.7
179D2-------------------- Gara	90	4e	4.5	2.6	4.3
179E--------------------- Gara	95	6e	---	2.6	4.3
179E2-------------------- Gara	90	6e	---	2.2	3.6
179F2-------------------- Gara	95	7e	---	2.0	3.3
180---------------------- Keomah	95	2w	5.2	3.2	5.4
220---------------------- Nodaway	90	2w	6.4	3.8	6.3
222C--------------------- Clarinda	90	4w	2.5	2.0	3.4
222C2-------------------- Clarinda	90	4w	2.2	1.8	3.0
223C2-------------------- Rinda	90	4w	2.5	1.5	2.6
273C--------------------- Olmitz	95	3e	5.5	3.2	5.4
279---------------------- Taintor	95	2w	4.7	3.8	6.4
280---------------------- Mahaska	95	1	6.6	4.1	6.8
280B--------------------- Mahaska	90	2e	6.5	4.0	6.6
281B--------------------- Otley	90	2e	6.6	3.9	6.4
281B2-------------------- Otley	90	2e	6.4	3.8	6.3
281C--------------------- Otley	95	3e	6.4	3.7	6.2
281C2-------------------- Otley	90	3e	6.2	3.6	6.1
281D2-------------------- Otley	90	3e	5.8	3.4	5.7
293C---------------------			2.7	2.1	3.6
Chelsea------------------	57	4s			
Fayette------------------	38	3e			

See footnote at end of table.

Table 7.--Land Capability and Yields per Acre of Pasture--Continued

Map symbol and soil name	Percent of map unit	Land capability	Bromegrass-alfalfa hay	Kentucky bluegrass	Smooth bromegrass
			Tons	AUM*	AUM*
293D			1.6	1.9	3.2
Chelsea	57	6s			
Fayette	38	3e			
293E			2.7	1.6	2.7
Chelsea	57	7s			
Fayette	38	4e			
293F			---	1.3	2.1
Chelsea	57	7s			
Fayette	38	6e			
294C			4.7	2.8	4.6
Billett	65	3e			
Ladoga	35	3e			
294D			4.0	2.3	4.2
Billett	65	4e			
Ladoga	35	3e			
313F2 Gosport	95	7e	---	0.9	1.5
319E Dunbarton	95	6e	---	1.3	2.1
422 Amana	90	2w	5.8	3.6	5.9
423D2 Bucknell	90	4e	2.6	1.6	2.6
424D			3.9	2.3	3.8
Lindley	52	4e			
Keswick	43	4e			
424D2			3.6	2.1	3.8
Lindley	52	4e			
Keswick	43	4e			
424E2			---	1.3	2.3
Lindley	48	6e			
Keswick	42	6e			
425D Keswick	90	4e	2.7	1.6	2.7
425D2 Keswick	90	4e	2.3	1.4	2.3
428B Ely	95	2e	6.4	3.9	6.5
430 Ackmore	90	2w	4.2	3.5	5.8
453 Tuskeego	95	3w	3.2	2.6	4.3
520 Coppock	95	2w	3.6	3.0	5.0

See footnote at end of table.

Table 7.--Land Capability and Yields per Acre of Pasture--Continued

Map symbol and soil name	Percent of map unit	Land capability	Bromegrass-alfalfa hay	Kentucky bluegrass	Smooth bromegrass
			Tons	AUM*	AUM*
520B--------------------- Coppock	95	2w	3.5	2.9	4.8
570C--------------------- Nira	95	3e	6.2	3.6	6.0
570C2-------------------- Nira	95	3e	6.2	3.6	6.0
571C2-------------------- Hedrick	89	3e	5.4	3.1	5.2
571D2-------------------- Hedrick	95	3e	5.0	2.9	4.9
572C2-------------------- Inton	90	3e	5.3	3.1	5.1
572D2-------------------- Inton	90	3e	4.9	2.9	4.8
587---------------------- Chequest	90	2w	3.6	3.0	4.9
587+--------------------- Chequest	90	2w	3.6	3.1	5.1
687B--------------------- Watkins	90	2e	6.3	3.7	6.2
688---------------------- Koszta	90	1	6.2	3.8	6.3
722----------------------			6.1	3.8	6.3
Nodaway------------------	36	2w			
Ackmore------------------	32	2w			
Vesser-------------------	22	2w			
730B---------------------			4.6	3.8	6.3
Nodaway------------------	46	2w			
Coppock------------------	27	2w			
Cantril------------------	17	2e			
779---------------------- Kalona	95	2w	6.1	3.7	6.2
792C2-------------------- Armstrong	90	3e	2.9	1.8	3.0
792D2-------------------- Armstrong	95	4e	2.6	1.5	2.5
795C2-------------------- Ashgrove	95	4e	2.9	1.8	3.0
795D2-------------------- Ashgrove	82	4e	2.5	1.5	2.5
822D2-------------------- Lamoni	90	4e	2.9	1.8	3.0

See footnote at end of table.

Table 7.--Land Capability and Yields per Acre of Pasture--Continued

Map symbol and soil name	Percent of map unit	Land capability	Bromegrass-alfalfa hay	Kentucky bluegrass	Smooth bromegrass
			Tons	AUM*	AUM*
876B-------------------- Ladoga	90	2e	6.2	3.6	6.1
876C2------------------- Ladoga	90	3e	5.8	3.4	5.7
876D2------------------- Ladoga	90	3e	5.5	3.2	5.3
880B-------------------- Clinton	95	2e	5.7	3.3	5.5
880C2------------------- Clinton	95	3e	5.5	3.2	5.3
880D2------------------- Clinton	95	3e	5.1	3.0	5.0
881B-------------------- Otley	95	2e	6.6	3.9	6.4
911B--------------------			4.0	3.3	5.5
Colo-------------------	57	2w			
Ely--------------------	38	2e			
993D2-------------------			4.5	2.6	4.4
Gara-------------------	48	4e			
Armstrong--------------	42	4e			
993E2-------------------			---	2.2	3.7
Gara-------------------	48	6e			
Armstrong--------------	42	6e			
994D2-------------------			2.2	1.3	2.2
Galland----------------	65	4e			
Douds------------------	25	4e			
994E2-------------------			---	0.8	1.4
Galland----------------	55	6e			
Douds------------------	35	6e			
999F--------------------			---	0.2	0.3
Nordness---------------	62	7s			
Eleva------------------	23	7s			
999G--------------------			---	0.1	0.1
Nordness---------------	62	7s			
Eleva------------------	23	7s			
1075-------------------- Givin	90	1	5.9	3.6	6.1
1220-------------------- Nodaway	90	5w	4.2	2.0	6.2
1279-------------------- Taintor	95	2w	4.7	3.8	6.4
1280-------------------- Mahaska	95	1	6.6	4.1	6.8

See footnote at end of table.

Table 7.--Land Capability and Yields per Acre of Pasture--Continued

Map symbol and soil name	Percent of map unit	Land capability	Bromegrass-alfalfa hay	Kentucky bluegrass	Smooth bromegrass
			Tons	AUM*	AUM*
1315			4.2	1.5	6.2
Nodaway	57	5w			
Klum	38	5w			
5010	100	8s	---	---	---
Pits, sand and gravel					
5020	100	8s	---	---	---
Pits and Dumps					
5030	100	8s	---	---	---
Pits, limestone quarries					
5040.					
Orthents, loamy					
5048	100	7w	---	---	---
Aquents					
5060.					
Pits, clay					
5080.					
Orthents, sanitary landfill					
6051	93	3w	---	2.0	---
Vesser					
6054	95	4w	---	2.0	---
Zook					
6133	90	4w	---	2.0	---
Colo					
6133+	90	4w	---	2.0	---
Colo					
6220	90	4w	---	2.0	---
Nodaway					
6315			---	1.6	---
Nodaway	57	4w			
Klum	38	4w			
6422	89	3w	---	2.0	---
Amana					
6587	90	4w	---	2.0	---
Chequest					
AW.					
Animal waste					
SL.					
Sewage lagoon					

See footnote at end of table.

Table 7.--Land Capability and Yields per Acre of Pasture--Continued

Map symbol and soil name	Percent of map unit	Land capability	Bromegrass-alfalfa hay	Kentucky bluegrass	Smooth bromegrass
			Tons	AUM*	AUM*
W.					
Water					

* Animal unit month: The amount of forage or feed required to feed one animal unit (one horse, one cow, one mule, five sheep, or five goats) for 30 days.

Table 8.--Prime Farmland

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name.)

Map symbol	Soil name
8B	Judson silty clay loam, 2 to 5 percent slopes
13B	Olmitz-Vesser-Zook complex, 0 to 5 percent slopes (where drained)
51	Vesser silt loam, 0 to 2 percent slopes, occasionally flooded (where drained)
51B	Vesser silt loam, 2 to 5 percent slopes, rarely flooded (where drained)
54	Zook silty clay, 0 to 2 percent slopes, occasionally flooded (where drained)
54+	Zook silt loam, 0 to 2 percent slopes, occasionally flooded, overwash (where drained)
56B	Cantril loam, 2 to 5 percent slopes
74	Rubio silt loam, 0 to 2 percent slopes (where drained)
75	Givin silt loam, 0 to 2 percent slopes
75B	Givin silt loam, 2 to 5 percent slopes
76B	Ladoga silt loam, 2 to 5 percent slopes
76B2	Ladoga silty clay loam, 2 to 5 percent slopes, moderately eroded
80B	Clinton silt loam, 2 to 5 percent slopes
87B	Colo-Zook complex, 0 to 3 percent slopes (where drained)
122	Sperry silt loam, 0 to 1 percent slopes (where drained)
133	Colo silty clay loam, 0 to 2 percent slopes, occasionally flooded (where drained)
133+	Colo silt loam, 0 to 2 percent slopes, occasionally flooded, overwash (where drained)
133B	Colo silty clay loam, 2 to 5 percent slopes, rarely flooded (where drained)
180	Keomah silt loam, 0 to 2 percent slopes
220	Nodaway silt loam, 0 to 2 percent slopes, occasionally flooded (where drained)
279	Taintor silty clay loam, 0 to 2 percent slopes (where drained)
280	Mahaska silty clay loam, 0 to 2 percent slopes
280B	Mahaska silty clay loam, 2 to 5 percent slopes
281B	Otley silty clay loam, 2 to 5 percent slopes
281B2	Otley silty clay loam, 2 to 5 percent slopes, moderately eroded
422	Amana silt loam, 0 to 2 percent slopes, occasionally flooded
428B	Ely silty clay loam, 2 to 5 percent slopes
430	Ackmore silt loam, 0 to 2 percent slopes, occasionally flooded
453	Tuskeego silt loam, 0 to 2 percent slopes, occasionally flooded (where drained)
520	Coppock silt loam, 0 to 2 percent slopes, occasionally flooded (where drained)
520B	Coppock silt loam, 2 to 5 percent slopes, rarely flooded (where drained)
587	Chequest silty clay loam, 0 to 2 percent slopes, occasionally flooded (where drained)
587+	Chequest silt loam, 0 to 2 percent slopes, occasionally flooded, overwash (where drained)
687B	Watkins silt loam, 2 to 5 percent slopes
688	Koszta silt loam, 0 to 2 percent slopes
722	Nodaway-Ackmore-Vesser complex, 0 to 2 percent slopes, occasionally flooded (where drained)
730B	Nodaway, occasionally flooded-Coppock-Cantril, rarely flooded, complex, 2 to 5 percent slopes
779	Kalona silty clay loam, 0 to 2 percent slopes (where drained)
876B	Ladoga silt loam, terrace, 2 to 5 percent slopes
880B	Clinton silt loam, terrace, 2 to 5 percent slopes
881B	Otley silty clay loam, terrace, 2 to 5 percent slopes
911B	Colo-Ely complex, 2 to 5 percent slopes (where drained)
1075	Givin silt loam, terrace, 0 to 2 percent slopes
1279	Taintor silty clay loam, terrace, 0 to 2 percent slopes (where drained)
1280	Mahaska silty clay loam, terrace, 0 to 2 percent slopes

Table 9.--Forestland Productivity

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available.)

Map symbol and soil name	Percent of map unit	Potential productivity: Common trees	Site index	Volume of wood fiber	Trees to manage
				cu ft/ac	
56B:					
Cantril	90	White oak	75	57	Eastern white pine, red pine, sugar maple, white spruce
56C:					
Cantril	90	White oak	75	57	Eastern white pine, red pine, sugar maple, white spruce
65D2:					
Lindley	95	Black oak	63	43	Black oak, northern red oak, white oak
		Northern red oak	61	43	
		White oak	56	43	
65E:					
Lindley	95	Black oak	63	43	Black oak, northern red oak, white oak
		Northern red oak	61	43	
		White oak	56	43	
65E2:					
Lindley	90	Black oak	63	43	Black oak, northern red oak, white oak
		Northern red oak	61	43	
		White oak	56	43	
65F:					
Lindley	90	Black oak	63	43	Black oak, northern red oak, white oak
		Northern red oak	61	43	
		White oak	56	43	
65F2:					
Lindley	90	Black oak	63	43	Black oak, northern red oak, white oak
		Northern red oak	61	43	
		White oak	56	43	
65G:					
Lindley	95	Black oak	63	43	Black oak, northern red oak, white oak
		Northern red oak	61	43	
		White oak	56	43	
74:					
Rubio	95	White oak	45	29	American sycamore, eastern arborvitae, eastern cottonwood, green ash, laurel willow, silver maple

Table 9.--Forestland Productivity--Continued

Map symbol and soil name	Percent of map unit	Common trees	Site index	Volume of wood fiber	Trees to manage
				cu ft/ac	
75:					
Givin	95	Northern red oak	---	---	Black walnut, eastern white pine, northern red oak, red pine, sugar maple, white oak
		White oak	65	43	
75B:					
Givin	95	Northern red oak	---	---	Black walnut, eastern white pine, northern red oak, red pine, sugar maple, white oak
		White oak	65	43	
76B:					
Ladoga	95	Northern red oak	75	57	European larch, black walnut, eastern white pine, northern red oak, red pine, sugar maple, white oak
		White oak	75	57	
76B2:					
Ladoga	90	Northern red oak	75	57	European larch, black walnut, eastern white pine, northern red oak, red pine, sugar maple, white oak
		White oak	75	57	
76C:					
Ladoga	95	Northern red oak	75	57	European larch, black walnut, eastern white pine, northern red oak, red pine, sugar maple, white oak
		White oak	75	57	
76C2:					
Ladoga	90	Northern red oak	75	57	European larch, black walnut, eastern white pine, northern red oak, red pine, sugar maple, white oak
		White oak	75	57	
76D2:					
Ladoga	90	Northern red oak	75	57	European larch, black walnut, eastern white pine, northern red oak, red pine, sugar maple, white oak
		White oak	75	57	

Table 9.--Forestland Productivity--Continued

Map symbol and soil name	Percent of map unit	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume of wood fiber	Trees to manage
				cu ft/ac	
80B:					
Clinton	95	Northern red oak	65	43	European larch, black walnut, eastern white pine, northern red oak, red pine, white oak
		White oak	65	43	
80C:					
Clinton	95	Northern red oak	65	43	European larch, black walnut, eastern white pine, northern red oak, red pine, white oak
		White oak	65	43	
80C2:					
Clinton	90	Northern red oak	65	43	European larch, black walnut, eastern white pine, northern red oak, red pine, white oak
		White oak	65	43	
80D:					
Clinton	90	Northern red oak	65	43	European larch, black walnut, eastern white pine, northern red oak, red pine, white oak
		White oak	65	43	
80D2:					
Clinton	90	Northern red oak	65	43	European larch, black walnut, eastern white pine, northern red oak, red pine, white oak
		White oak	65	43	
163E:					
Fayette	90	Black walnut	---	---	Eastern white pine, green ash, northern red oak, tuliptree
		Northern red oak	80	57	
		Tuliptree	90	86	
		White oak	80	57	
163E2:					
Fayette	90	Black walnut	---	---	Eastern white pine, green ash, northern red oak, tuliptree
		Northern red oak	80	57	
		Tuliptree	90	86	
		White oak	80	57	
163F:					
Fayette	90	Black walnut	---	---	Eastern white pine, green ash, northern red oak, tuliptree
		Northern red oak	80	57	
		Tuliptree	90	86	
		White oak	80	57	

Table 9.--Forestland Productivity--Continued

Map symbol and soil name	Percent of map unit	Potential productivity: Common trees	Site index	Volume of wood fiber	Trees to manage
				cu ft/ac	
179D2:					
Gara	90	Northern red oak	55	43	Eastern white pine, northern red oak, red pine, white oak
		White oak	55	43	
179E2:					
Gara	90	Northern red oak	55	43	Eastern white pine, northern red oak, red pine, white oak
		White oak	55	43	
179F2:					
Gara	95	Northern red oak	55	43	Eastern white pine, northern red oak, red pine, white oak
		White oak	55	43	
180:					
Keomah	95	Northern red oak	70	57	Black walnut, eastern white pine, northern red oak, red pine, sugar maple, white oak
		White oak	65	43	
220:					
Nodaway	90	White oak	65	43	European larch, black walnut, eastern white pine, red pine, sugar maple
223C2:					
Rinda	90	Northern red oak	45	29	American sycamore, Norway spruce, common hackberry, eastern redcedar, green ash, silver maple, white spruce
		White oak	45	29	
293C:					
Chelsea	57	White oak	55	43	European larch, Scotch pine, eastern redcedar, eastern white pine, jack pine, red pine
Fayette	38	Black walnut	---	---	Eastern white pine, green ash, northern red oak, tuliptree
		Northern red oak	80	57	
		Tuliptree	90	86	
		White oak	80	57	

Table 9.--Forestland Productivity--Continued

Map symbol and soil name	Percent of map unit	Common trees	Site index	Volume of wood fiber	Trees to manage
				cu ft/ac	
293D:					
Chelsea	57	White oak	55	43	European larch, Scotch pine, eastern redcedar, eastern white pine, jack pine, red pine
Fayette	38	Black walnut	---	---	Eastern white pine, green ash, northern red oak, tuliptree
		Northern red oak	80	57	
		Tuliptree	90	86	
		White oak	80	57	
293E:					
Chelsea	57	White oak	55	43	European larch, Scotch pine, eastern redcedar, eastern white pine, jack pine, red pine
Fayette	38	Black walnut	---	---	Eastern white pine, green ash, northern red oak, tuliptree
		Northern red oak	80	57	
		Tuliptree	90	86	
		White oak	80	57	
293F:					
Chelsea	57	White oak	55	43	European larch, Scotch pine, eastern redcedar, eastern white pine, jack pine, red pine
Fayette	38	Black walnut	---	---	Eastern white pine, green ash, northern red oak, tuliptree
		Northern red oak	80	57	
		Tuliptree	90	86	
		White oak	80	57	
294C:					
Billett	65	Black cherry	---	---	Norway spruce, eastern white pine, red pine, white spruce
		Black oak	---	---	
		Bur oak	---	---	
		Northern red oak	60	57	
		Shagbark hickory	---	---	
		White oak	---	---	
Ladoga	35	Eastern white pine	---	---	Eastern white pine, jack pine, red pine
		Jack pine	---	---	
		Northern red oak	70	57	
		Red pine	---	---	
294D:					
Billett	65	Black cherry	---	---	Norway spruce, eastern white pine, red pine, white spruce
		Black oak	---	---	
		Bur oak	---	---	
		Northern red oak	60	57	
		Shagbark hickory	---	---	
		White oak	---	---	

Table 9.--Forestland Productivity--Continued

Map symbol and soil name	Percent of map unit	Common trees	Site index (Potential productivity)	Volume of wood fiber (Potential productivity)	Trees to manage
				cu ft/ac	
294D:					
Ladoga	35	Eastern white pine	---	---	Eastern white pine, jack pine, red pine
		Jack pine	---	---	
		Northern red oak	70	57	
		Red pine	---	---	
319E:					
Dunbarton	95	Black oak	---	---	Eastern redcedar, eastern white pine, jack pine, red pine
		Northern red oak	61	57	
		Shagbark hickory	---	---	
		White oak	---	---	
422:					
Amana	90	Northern red oak	58	43	Black walnut, eastern white pine, red pine, sugar maple
		White oak	62	43	
423D2:					
Bucknell	90	Northern red oak	50	29	American sycamore, common hackberry, eastern redcedar, green ash, silver maple
		White oak	50	29	
424D:					
Lindley	52	Black oak	63	43	Black oak, northern red oak, white oak
		Northern red oak	61	43	
		White oak	56	43	
Keswick	43	Northern red oak	55	43	Eastern white pine, red pine, sugar maple
		White oak	55	43	
424D2:					
Lindley	52	Black oak	63	43	Black oak, northern red oak, white oak
		Northern red oak	61	43	
		White oak	56	43	
Keswick	43	Northern red oak	55	43	Eastern white pine, red pine, sugar maple
		White oak	55	43	
424E2:					
Lindley	48	Black oak	63	43	Black oak, northern red oak, white oak
		Northern red oak	61	43	
		White oak	56	43	
Keswick	42	Northern red oak	55	43	Eastern white pine, red pine, sugar maple
		White oak	55	43	
425D:					
Keswick	90	Northern red oak	55	43	Eastern white pine, red pine, sugar maple
		White oak	55	43	
425D2:					
Keswick	90	Northern red oak	55	43	Eastern white pine, red pine, sugar maple
		White oak	55	43	

Table 9.--Forestland Productivity--Continued

Map symbol and soil name	Percent of map unit	Potential productivity: Common trees	Site index	Volume of wood fiber	Trees to manage
				cu ft/ac	
430:					
Ackmore	90	White oak	65	43	Black walnut, cottonwood, eastern white pine, red pine, sugar maple
453:					
Tuskeego	95	Eastern cottonwood	90	100	American sycamore, eastern arborvitae, eastern cottonwood, green ash, laurel willow, silver maple
		Silver maple	80	29	
520:					
Coppock	95	Northern red oak	65	43	Eastern white pine, red pine, sugar maple
		White oak	65	43	
520B:					
Coppock	95	Northern red oak	65	43	Eastern white pine, red pine, sugar maple
		White oak	65	43	
571C2:					
Hedrick	89	White oak	75	57	Norway spruce, Scotch pine, eastern redcedar, eastern white pine, red pine, sugar maple, white spruce
571D2:					
Hedrick	95	White oak	75	57	Norway spruce, Scotch pine, eastern redcedar, eastern white pine, red pine, sugar maple, white spruce
572C2:					
Inton	90	Northern red oak	65	43	Black walnut, eastern white pine, red pine, sugar maple
		White oak	65	43	
572D2:					
Inton	90	Northern red oak	65	43	Black walnut, eastern white pine, red pine, sugar maple
		White oak	65	43	

Table 9.--Forestland Productivity--Continued

Map symbol and soil name	Percent of map unit	Potential productivity: Common trees	Site index	Volume of wood fiber	Trees to manage
				cu ft/ac	
587:					
Chequest	90	Eastern cottonwood Silver maple	90 80	100 29	American sycamore, eastern arborvitae, eastern cottonwood, green ash, laurel willow, silver maple
587+:					
Chequest	90	Eastern cottonwood Silver maple	90 80	100 29	American sycamore, eastern arborvitae, eastern cottonwood, green ash, laurel willow, silver maple
687B:					
Watkins	90	Northern red oak White oak	70 65	57 43	Eastern white pine, red pine, sugar maple
688:					
Koszta	90	Northern red oak White oak	70 65	57 43	Eastern white pine, northern red oak, red pine, sugar maple, white oak
722:					
Nodaway	36	White oak	65	43	European larch, black walnut, eastern white pine, red pine, sugar maple
Ackmore	32	White oak	65	43	Black walnut, cottonwood, eastern white pine, red pine, sugar maple
Vesser	22	---	---	---	---
730B:					
Nodaway	46	White oak	65	43	European larch, black walnut, eastern white pine, red pine, sugar maple
Coppock	27	Northern red oak White oak	65 65	43 43	Eastern white pine, red pine, sugar maple
Cantril	17	White oak	75	57	Eastern white pine, red pine, sugar maple, white spruce

Table 9.--Forestland Productivity--Continued

Map symbol and soil name	Percent of map unit	Potential productivity: Common trees	Site index	Volume of wood fiber	Trees to manage
				cu ft/ac	
792C2:					
Armstrong	90	Northern red oak	55	43	European larch, eastern white pine, red pine, sugar maple
		White oak	55	43	
792D2:					
Armstrong	95	Northern red oak	55	43	European larch, eastern white pine, red pine, sugar maple
		White oak	55	43	
795C2:					
Ashgrove	95	Northern red oak	45	29	American sycamore, common hackberry, green ash, silver maple
		White oak	45	29	
795D2:					
Ashgrove	82	Northern red oak	45	29	American sycamore, common hackberry, green ash, silver maple
		White oak	45	29	
876B:					
Ladoga	90	Northern red oak	75	57	European larch, black walnut, eastern white pine, northern red oak, red pine, sugar maple, white oak
		White oak	75	57	
876C2:					
Ladoga	90	Northern red oak	75	57	European larch, black walnut, eastern white pine, northern red oak, red pine, sugar maple, white oak
		White oak	75	57	
876D2:					
Ladoga	90	Northern red oak	75	57	European larch, black walnut, eastern white pine, northern red oak, red pine, sugar maple, white oak
		White oak	75	57	
880B:					
Clinton	95	Northern red oak	65	43	European larch, black walnut, eastern white pine, northern red oak, red pine, white oak
		White oak	65	43	

Table 9.--Forestland Productivity--Continued

Map symbol and soil name	Percent of map unit	Common trees	Potential productivity: Site index	Potential productivity: Volume of wood fiber	Trees to manage
				cu ft/ac	
880C2:					
Clinton	95	Northern red oak	65	43	European larch, black walnut, eastern white pine, northern red oak, red pine, white oak
		White oak	65	43	
880D2:					
Clinton	95	Northern red oak	65	43	European larch, black walnut, eastern white pine, northern red oak, red pine, white oak
		White oak	65	43	
993D2:					
Gara	48	Northern red oak	55	43	Eastern white pine, northern red oak, red pine, white oak
		White oak	55	43	
Armstrong	42	Northern red oak	55	43	European larch, eastern white pine, red pine, sugar maple
		White oak	55	43	
993E2:					
Gara	48	Northern red oak	55	43	Eastern white pine, northern red oak, red pine, white oak
		White oak	55	43	
Armstrong	42	Northern red oak	55	43	European larch, eastern white pine, red pine, sugar maple
		White oak	55	43	
994D2:					
Galland	65	Northern red oak	70	57	Black walnut, eastern white pine, red pine, sugar maple
		White oak	65	43	
Douds	25	Northern red oak	55	43	European larch, Norway spruce, Scotch pine, eastern white pine, red pine, sugar maple, white spruce
		White oak	55	43	
994E2:					
Galland	55	Northern red oak	70	57	Black walnut, eastern white pine, red pine, sugar maple
		White oak	65	43	

Table 9.--Forestland Productivity--Continued

Map symbol and soil name	Percent of map unit	Potential productivity: Common trees	Site index	Volume of wood fiber	Trees to manage
				cu ft/ac	
994E2:					
Douds	35	Northern red oak	55	43	European larch, Norway spruce, Scotch pine, eastern white pine, red pine, sugar maple, white spruce
		White oak	55	43	
999F:					
Nordness	62	Northern red oak	45	29	---
		White oak	45	29	
Eleva	23	Jack pine	49	57	Jack pine, red pine
999G:					
Nordness	62	Black oak	44	29	---
		Northern red oak	---	---	
Eleva	23	Black oak	44	29	Jack pine, red pine
		Jack pine	49	57	
		Northern red oak	---	---	
1075:					
Givin	90	Northern red oak	---	---	Black walnut, eastern white pine, northern red oak, red pine, sugar maple, white oak
		White oak	65	43	
1220:					
Nodaway	90	White oak	65	43	European larch, black walnut, eastern white pine, red pine, sugar maple
1315:					
Nodaway	57	White oak	65	43	European larch, black walnut, eastern white pine, red pine, sugar maple
Klum	38	---	---	---	---
6220:					
Nodaway	90	White oak	65	43	European larch, black walnut, eastern white pine, red pine, sugar maple
6315:					
Nodaway	57	White oak	65	43	European larch, black walnut, eastern white pine, red pine, sugar maple
Klum	38	---	---	---	---

Table 9.--Forestland Productivity--Continued

Map symbol and soil name	Percent of map unit	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume of wood fiber	Trees to manage
				cu ft/ac	
6422:					
Amana	89	Northern red oak	58	43	Black walnut, eastern white pine, red pine, sugar maple
		White oak	62	43	
6587:					
Chequest	90	Eastern cottonwood	90	100	American sycamore, eastern arborvitae, eastern cottonwood, green ash, laurel willow, silver maple
		Silver maple	80	29	

Table 10.--Windbreaks and Environmental Plantings

(Only the soils that are suitable for windbreaks and environmental plantings are listed. Absence of an entry indicates that trees generally do not grow to the given height.)

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
8B:						
Judson	95	Amur honeysuckle, common lilac	Amur maple, autumn-olive	Russian-olive, bur oak, common hackberry, eastern redcedar	Austrian pine, eastern white pine, green ash, honeylocust	---
8C:						
Judson	95	Amur honeysuckle, common lilac	Amur maple, autumn-olive	Russian-olive, bur oak, common hackberry, eastern redcedar	Austrian pine, eastern white pine, green ash, honeylocust	---
13B:						
Olmitz	30	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, eastern arborvitae, blue spruce, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
Vesser	28	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak
Zook	27	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak
24D2:						
Shelby	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of--				
		<8	8-15	16-25	26-35	>35
24E2:						
Shelby	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
51:						
Vesser	90	---	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak
51B:						
Vesser	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak
54:						
Zook	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae	Norway spruce, eastern white pine	Pin oak
56B:						
Cantril	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
56C:						
Cantril	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of--				
		<8	8-15	16-25	26-35	>35
65D2:						
Lindley-----------------	95	Fragrant sumac, redosier dogwood, silky dogwood	American plum, southern arrowwood	Washington hawthorn	Douglas fir, green ash, northern red oak, pin oak	Eastern white pine
65E:						
Lindley-----------------	95	Fragrant sumac, redosier dogwood, silky dogwood	American plum, southern arrowwood	Washington hawthorn	Douglas fir, green ash, northern red oak, pin oak	Eastern white pine
65E2:						
Lindley-----------------	90	Fragrant sumac, redosier dogwood, silky dogwood	American plum, southern arrowwood	Washington hawthorn	Douglas fir, white fir, green ash, northern red oak, pin oak	Eastern white pine
65F:						
Lindley-----------------	90	Fragrant sumac, redosier dogwood, silky dogwood	American plum, southern arrowwood	Washington hawthorn	Douglas fir, white fir, green ash, northern red oak, pin oak	Eastern white pine
65F2:						
Lindley-----------------	90	Fragrant sumac, redosier dogwood, silky dogwood	American plum, southern arrowwood	Washington hawthorn	Douglas fir, white fir, green ash, northern red oak, pin oak	Eastern white pine
65G:						
Lindley-----------------	95	Fragrant sumac, redosier dogwood, silky dogwood	American plum, southern arrowwood	Washington hawthorn	Douglas fir, white fir, green ash, northern red oak, pin oak	Eastern white pine
74:						
Rubio-------------------	95	Silky dogwood-------	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak
75:						
Givin-------------------	95	Silky dogwood-------	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
75B:						
Givin	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
76B:						
Ladoga	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
76B2:						
Ladoga	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
76C:						
Ladoga	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
76C2:						
Ladoga	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
76D2:						
Ladoga	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
80B:						
Clinton	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
80C:						
Clinton	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
80C2:						
Clinton	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
80D:						
Clinton	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
80D2:						
Clinton	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
87B:						
Colo	68	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
87B:						
Zook	32	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak
93D2:						
Shelby	60	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
Adair	40	American cranberrybush	Amur honeysuckle, Amur privet, southern arrowwood	Washington hawthorn, eastern redcedar, green ash, osageorange, Austrian pine	Eastern white pine, pin oak	---
122:						
Sperry	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak
133:						
Colo	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak
133+:						
Colo	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
133B:						
Colo	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak
163E:						
Fayette	90	Silky dogwood	American cranberrybush	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
163E2:						
Fayette	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
163F:						
Fayette	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
179D2:						
Gara	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
179E:						
Gara	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
179E2:						
Gara	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
179F2:						
Gara	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
180:						
Keomah	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
220:						
Nodaway	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
222C:						
Clarinda	90	American cranberrybush	Amur honeysuckle, Amur privet, southern arrowwood	Washington hawthorn, eastern redcedar, green ash, osageorange	Austrian pine, eastern white pine, pin oak	---
222C2:						
Clarinda	90	American cranberrybush	Amur honeysuckle, Amur privet, southern arrowwood	Washington hawthorn, eastern redcedar, green ash, osageorange	Austrian pine, eastern white pine, pin oak	---

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
223C2:						
Rinda	90	American cranberrybush	Amur honeysuckle, Amur privet, southern arrowwood	Washington hawthorn, eastern redcedar, green ash, osageorange, Austrian pine	Eastern white pine, pin oak	---
273C:						
Olmitz	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, eastern arborvitae, blue spruce, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
279:						
Taintor	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak
280:						
Mahaska	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
280B:						
Mahaska	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
281B:						
Otley	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
281B2:						
Otley	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
281C:						
Otley	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
281C2:						
Otley	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
281D2:						
Otley	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
293C:						
Chelsea	57	Amur honeysuckle, Siberian peashrub, common lilac	Washington hawthorn, autumn-olive, radiant crabapple	Austrian pine, eastern redcedar, jack pine, red pine	Eastern white pine	---
Fayette	38	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
293D:						
Chelsea	57	Amur honeysuckle, Siberian peashrub, common lilac	Washington hawthorn, autumn-olive, radiant crabapple	Austrian pine, eastern redcedar, jack pine, red pine	Eastern white pine	---

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
293D:						
Fayette	38	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
293E:						
Chelsea	57	Amur honeysuckle, Siberian peashrub, common lilac	Washington hawthorn, autumn-olive, radiant crabapple	Austrian pine, eastern redcedar, jack pine, red pine	Eastern white pine	---
Fayette	38	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
293F:						
Chelsea	57	Amur honeysuckle, Siberian peashrub, common lilac	Washington hawthorn, autumn-olive, radiant crabapple	Austrian pine, eastern redcedar, jack pine, red pine	Eastern white pine	---
Fayette	38	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
294C:						
Billett	65	Amur honeysuckle, common lilac	Washington hawthorn, autumn-olive, eastern redcedar, radiant crabapple	Austrian pine, jack pine, red pine, eastern white pine	---	---
Ladoga	35	Amur honeysuckle, Siberian peashrub, common lilac	Washington hawthorn, autumn-olive, radiant crabapple	Austrian pine, eastern redcedar, jack pine, red pine, osageorange	Eastern white pine	---
294D:						
Billett	65	Amur honeysuckle, common lilac	Washington hawthorn, autumn-olive, eastern redcedar, radiant crabapple	Austrian pine, jack pine, red pine, eastern white pine	---	---

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
294D:						
Ladoga	35	Amur honeysuckle, Siberian peashrub, common lilac	Washington hawthorn, autumn-olive	Austrian pine, eastern redcedar, red pine	Eastern white pine	---
313F2:						
Gosport	95	American cranberrybush	Amur honeysuckle, Amur privet, southern arrowwood	Washington hawthorn, eastern redcedar, green ash, osageorange, Austrian pine	Eastern white pine, pin oak	---
422:						
Amana	90	Silky dogwood	American cranberrybush	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
423D2:						
Bucknell	90	American cranberrybush	Amur honeysuckle, Amur privet, southern arrowwood	Washington hawthorn, eastern redcedar, green ash, osageorange, Austrian pine	Eastern white pine, pin oak	---
424D:						
Lindley	52	Fragrant sumac, redosier dogwood, silky dogwood	American plum, southern arrowwood	Washington hawthorn	Douglas fir, white fir, green ash, northern red oak, pin oak	Eastern white pine
Keswick	43	American cranberrybush	Amur honeysuckle, Amur privet, southern arrowwood	Washington hawthorn, eastern redcedar, green ash, osageorange, Austrian pine	Eastern white pine, pin oak	---
424D2:						
Lindley	52	Fragrant sumac, redosier dogwood, silky dogwood	American plum, southern arrowwood	Washington hawthorn	Douglas fir, white fir, green ash, northern red oak, pin oak	Eastern white pine

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
424D2:						
Keswick	43	American cranberrybush	Amur honeysuckle, Amur privet, southern arrowwood	Washington hawthorn, eastern redcedar, green ash, osageorange, Austrian pine	Eastern white pine, pin oak	---
424E2:						
Lindley	48	Fragrant sumac, redosier dogwood, silky dogwood	American plum, southern arrowwood	Washington hawthorn	Douglas fir, white fir, green ash, northern red oak, pin oak	Eastern white pine
Keswick	42	American cranberrybush	Amur honeysuckle, Amur privet, southern arrowwood	Washington hawthorn, eastern redcedar, green ash, osageorange, Austrian pine	Eastern white pine, pin oak	---
425D:						
Keswick	90	American cranberrybush	Amur honeysuckle, Amur privet, southern arrowwood	Washington hawthorn, eastern redcedar, green ash, osageorange, Austrian pine	Eastern white pine, pin oak	---
425D2:						
Keswick	90	American cranberrybush	Amur honeysuckle, Amur privet, southern arrowwood	Washington hawthorn, eastern redcedar, green ash, osageorange, Austrian pine	Eastern white pine, pin oak	---
428B:						
Ely	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
430:						
Ackmore	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
453:						
Tuskeego	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak
520:						
Coppock	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
520B:						
Coppock	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
570C:						
Nira	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
571C2:						
Hedrick	89	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
571D2:						
Hedrick	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
572C2:						
Inton	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae	Austrian pine, Norway spruce	Pin oak, silver maple, eastern white pine
572D2:						
Inton	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae	Austrian pine, Norway spruce	Pin oak, silver maple, eastern white pine
587:						
Chequest	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak
587+:						
Chequest	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak
687B:						
Watkins	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
688:						
Koszta	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
722:						
Nodaway	36	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
Ackmore	32	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
Vesser	22	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak
730B:						
Nodaway	46	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
Coppock	27	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
Cantril	17	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
779:						
Kalona	95	Silky dogwood	American cranberrybush	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak
792C2:						
Armstrong	90	American cranberrybush	Amur honeysuckle, Amur privet, southern arrowwood	Washington hawthorn, eastern redcedar, green ash, osageorange, Austrian pine	Eastern white pine, pin oak	---
792D2:						
Armstrong	95	American cranberrybush	Amur honeysuckle, Amur privet, southern arrowwood	Washington hawthorn, eastern redcedar, green ash, osageorange, Austrian pine	Eastern white pine, pin oak	---
795C2:						
Ashgrove	95	American cranberrybush	Amur honeysuckle, Amur privet, southern arrowwood	Washington hawthorn, eastern redcedar, green ash, osageorange, Austrian pine	Eastern white pine, pin oak	---
795D2:						
Ashgrove	82	American cranberrybush	Amur honeysuckle, Amur privet, southern arrowwood	Washington hawthorn, eastern redcedar, green ash, osageorange, Austrian pine	Eastern white pine, pin oak	---
822D2:						
Lamoni	90	American cranberrybush	Amur honeysuckle, Amur privet, southern arrowwood	Washington hawthorn, eastern redcedar, green ash, osageorange, Austrian pine	Eastern white pine, pin oak	---

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
876B:						
Ladoga	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
876C2:						
Ladoga	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
876D2:						
Ladoga	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
880B:						
Clinton	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
880C2:						
Clinton	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
880D2:						
Clinton	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
881B:						
Otley	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
911B:						
Colo	57	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak
Ely	38	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
993D2:						
Gara	48	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
Armstrong	42	American cranberrybush	Amur honeysuckle, Amur privet, southern arrowwood	Washington hawthorn, eastern redcedar, green ash, osageorange, Austrian pine	Eastern white pine, pin oak	---
993E2:						
Gara	48	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
993E2:						
Armstrong	42	American cranberrybush	Amur honeysuckle, Amur privet, southern arrowwood	Washington hawthorn, eastern redcedar, green ash, osageorange, Austrian pine	Eastern white pine, pin oak	---
994D2:						
Galland	65	American cranberrybush	Amur honeysuckle, Amur privet, southern arrowwood	Washington hawthorn, eastern redcedar, green ash, osageorange, Austrian pine	Eastern white pine, pin oak	---
Douds	25	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, eastern arborvitae, blue spruce, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
994E2:						
Galland	55	American cranberrybush	Amur honeysuckle, Amur privet, southern arrowwood	Washington hawthorn, eastern redcedar, green ash, osageorange, Austrian pine	Eastern white pine, pin oak	---
Douds	35	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, eastern arborvitae, blue spruce, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
1075:						
Givin	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
1220:						
Nodaway	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
1279:						
Taintor	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak
1280:						
Mahaska	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
1315:						
Nodaway	57	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
1315:						
Klum	38	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
6051:						
Vesser	93	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak
6054:						
Zook	95	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae	Norway spruce, eastern white pine	Pin oak
6133:						
Colo	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak
6133+:						
Colo	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak
6220:						
Nodaway	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Percent of map unit	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
6315:						
Nodaway	57	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
Klum	38	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
6422:						
Amana	89	Silky dogwood	American cranberrybush	Amur privet, Washington hawthorn, blue spruce, eastern arborvitae, white fir	Austrian pine, Norway spruce	Pin oak, eastern white pine
6587:						
Chequest	90	Silky dogwood	American cranberrybush, Amur honeysuckle	Amur privet, Washington hawthorn, blue spruce, white fir, eastern arborvitae, Austrian pine	Norway spruce, eastern white pine	Pin oak

Table 11.--Windbreak Suitability Groups

(Suitable shrubs and trees with their mature heights are listed in table 10. Absence of an entry indicates that the soil is not assigned to a windbreak suitability group.)

Map symbol and soil name	Percent of map unit	Windbreak suitability group
8B:		
Judson	95	3
8C:		
Judson	95	3
13B:		
Olmitz	30	3
Vesser	28	2
Zook	27	2
24D2:		
Shelby	95	3
24E2:		
Shelby	90	3
51:		
Vesser	90	2
51B:		
Vesser	95	2
54:		
Zook	90	2
54+:		
Zook	90	2
56B:		
Cantril	90	1
56C:		
Cantril	90	1
65D2:		
Lindley	95	3
65E:		
Lindley	95	3
65E2:		
Lindley	90	3
65F:		
Lindley	90	3
65F2:		
Lindley	90	3
65G:		
Lindley	95	3
74:		
Rubio	95	2

Table 11.--Windbreak Suitability Groups--Continued

Map symbol and soil name	Percent of map unit	Windbreak suitability group
75:		
Givin	95	1
75B:		
Givin	95	1
76B:		
Ladoga	95	3
76B2:		
Ladoga	90	3
76C:		
Ladoga	95	3
76C2:		
Ladoga	90	3
76D2:		
Ladoga	90	3
80B:		
Clinton	95	3
80C:		
Clinton	95	3
80C2:		
Clinton	90	3
80D:		
Clinton	90	3
80D2:		
Clinton	90	3
87B:		
Colo	68	2
Zook	32	2
93D2:		
Shelby	60	3
Adair	40	4K
122:		
Sperry	95	2
133:		
Colo	95	2
133+:		
Colo	90	2
133B:		
Colo	90	2
163E:		
Fayette	90	3
163E2:		
Fayette	90	3

Table 11.--Windbreak Suitability Groups--Continued

Map symbol and soil name	Percent of map unit	Windbreak suitability group
163F:		
Fayette	90	3
179D2:		
Gara	90	3
179E:		
Gara	95	3
179E2:		
Gara	90	3
179F2:		
Gara	95	3
180:		
Keomah	95	1
220:		
Nodaway	90	1
222C:		
Clarinda	90	4K
222C2:		
Clarinda	90	4K
223C2:		
Rinda	90	4K
273C:		
Olmitz	95	3
279:		
Taintor	95	2
280:		
Mahaska	95	1
280B:		
Mahaska	90	1
281B:		
Otley	90	3
281B2:		
Otley	90	3
281C:		
Otley	95	3
281C2:		
Otley	90	3
281D2:		
Otley	90	3
293C:		
Chelsea	57	7
Fayette	38	3

Table 11.--Windbreak Suitability Groups--Continued

Map symbol and soil name	Percent of map unit	Windbreak suitability group
293D:		
Chelsea	57	7
Fayette	38	3
293E:		
Chelsea	57	7
Fayette	38	3
293F:		
Chelsea	57	7
Fayette	38	3
294C:		
Billett	65	6G
Ladoga	35	3
294D:		
Billett	65	6G
Ladoga	35	3
313F2:		
Gosport	95	4K
319E:		
Dunbarton	95	10
422:		
Amana	90	1
423D2:		
Bucknell	90	4K
424D:		
Lindley	52	3
Keswick	43	4K
424D2:		
Lindley	52	3
Keswick	43	4K
424E2:		
Lindley	48	3
Keswick	42	4K
425D:		
Keswick	90	4K
425D2:		
Keswick	90	4K
428B:		
Ely	95	1
430:		
Ackmore	90	1

Table 11.--Windbreak Suitability Groups--Continued

Map symbol and soil name	Percent of map unit	Windbreak suitability group
453:		
Tuskeego	95	2
520:		
Coppock	95	1
520B:		
Coppock	95	1
570C:		
Nira	95	3
570C2:		
Nira	95	3
571C2:		
Hedrick	89	3
571D2:		
Hedrick	95	3
572C2:		
Inton	90	3
572D2:		
Inton	90	3
587:		
Chequest	90	2
587+:		
Chequest	90	2
687B:		
Watkins	90	3
688:		
Koszta	90	1
722:		
Nodaway	36	1
Ackmore	32	1
Vesser	22	2
730B:		
Nodaway	46	1
Coppock	27	1
Cantril	17	1
779:		
Kalona	95	2
792C2:		
Armstrong	90	4K
792D2:		
Armstrong	95	4K
795C2:		
Ashgrove	95	4K

Table 11.--Windbreak Suitability Groups--Continued

Map symbol and soil name	Percent of map unit	Windbreak suitability group
795D2:		
Ashgrove	82	4K
822D2:		
Lamoni	90	4K
876B:		
Ladoga	90	3
876C2:		
Ladoga	90	3
876D2:		
Ladoga	90	3
880B:		
Clinton	95	3
880C2:		
Clinton	95	3
880D2:		
Clinton	95	3
881B:		
Otley	95	3
911B:		
Colo	57	2
Ely	38	1
993D2:		
Gara	48	3
Armstrong	42	4K
993E2:		
Gara	48	3
Armstrong	42	4K
994D2:		
Galland	65	4K
Douds	25	3
994E2:		
Galland	55	4K
Douds	35	3
999F:		
Nordness	62	10
Eleva	23	6D
999G:		
Nordness	62	10
Eleva	23	6D

Table 11.--Windbreak Suitability Groups--Continued

Map symbol and soil name	Percent of map unit	Windbreak suitability group
1075:		
Givin	90	1
1220:		
Nodaway	90	1
1279:		
Taintor	95	2
1280:		
Mahaska	95	1
1315:		
Nodaway	57	1
Klum	38	1
5010:		
Pits, sand and gravel	100	10
5020:		
Pits and Dumps	100	10
5030:		
Pits, limestone quarries	100	10
5040:		
Orthents, loamy	100	10
5048:		
Aquents	100	10
5060:		
Pits, clay	100	10
5080:		
Orthents, sanitary landfill	100	10
6051:		
Vesser	93	2
6054:		
Zook	95	2
6133:		
Colo	90	2
6133+:		
Colo	90	2
6220:		
Nodaway	90	1
6315:		
Nodaway	57	1
Klum	38	1
6422:		
Amana	89	1

Table 11.--Windbreak Suitability Groups--Continued

Map symbol and soil name	Percent of map unit	Windbreak suitability group
6587:		
Chequest	90	2
AW:		
Animal waste.		
SL:		
Sewage lagoon.		
W:		
Water.		

Table 12.--Recreational Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Percent of map unit	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
8B:						
Judson	95	Slight	Slight	Moderate: slope	Slight	Slight
8C:						
Judson	95	Slight	Slight	Severe: slope	Slight	Slight
13B:						
Olmitz	30	Slight	Slight	Moderate: slope	Slight	Slight
Vesser	28	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
Zook	27	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
24D2:						
Shelby	95	Moderate: percs slowly slope	Moderate: percs slowly slope	Severe: slope	Slight	Moderate: slope
24E2:						
Shelby	90	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
51:						
Vesser	90	Severe: flooding wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
51B:						
Vesser	95	Severe: flooding wetness	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: wetness
54:						
Zook	90	Severe: flooding wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
54+:						
Zook	90	Severe: flooding wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
56B:						
Cantril	90	Severe: wetness	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: wetness
56C:						
Cantril	90	Severe: wetness	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: wetness
65D2:						
Lindley	95	Moderate: percs slowly slope	Moderate: percs slowly slope	Severe: slope	Slight	Moderate: slope

Table 12.--Recreational Development--Continued

Map symbol and soil name	Percent of map unit	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
65E:						
Lindley	95	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
65E2:						
Lindley	90	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
65F:						
Lindley	90	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
65F2:						
Lindley	90	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
65G:						
Lindley	95	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
74:						
Rubio	95	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
75:						
Givin	95	Severe: wetness	Moderate: percs slowly wetness	Severe: wetness	Moderate: wetness	Moderate: wetness
75B:						
Givin	95	Severe: wetness	Moderate: percs slowly wetness	Severe: wetness	Moderate: wetness	Moderate: wetness
76B:						
Ladoga	95	Moderate: percs slowly	Moderate: percs slowly	Moderate: percs slowly slope	Slight	Slight
76B2:						
Ladoga	90	Moderate: percs slowly	Moderate: percs slowly	Moderate: percs slowly slope	Slight	Slight
76C:						
Ladoga	95	Moderate: percs slowly	Moderate: percs slowly	Severe: slope	Slight	Slight
76C2:						
Ladoga	90	Moderate: percs slowly	Moderate: percs slowly	Severe: slope	Slight	Slight
76D2:						
Ladoga	90	Moderate: percs slowly slope	Moderate: percs slowly slope	Severe: slope	Slight	Moderate: slope
80B:						
Clinton	95	Moderate: percs slowly	Moderate: percs slowly	Moderate: percs slowly slope	Slight	Slight
80C:						
Clinton	95	Moderate: percs slowly	Moderate: percs slowly	Severe: slope	Severe: erodes easily	Slight

Table 12.--Recreational Development--Continued

Map symbol and soil name	Percent of map unit	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
80C2:						
Clinton	90	Moderate: percs slowly	Moderate: percs slowly	Severe: slope	Severe: erodes easily	Slight
80D:						
Clinton	90	Moderate: percs slowly slope	Moderate: percs slowly slope	Severe: slope	Severe: erodes easily	Moderate: slope
80D2:						
Clinton	90	Moderate: percs slowly slope	Moderate: percs slowly slope	Severe: slope	Severe: erodes easily	Moderate: slope
87B:						
Colo	68	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
Zook	32	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
93D2:						
Shelby	60	Moderate: percs slowly slope	Moderate: percs slowly slope	Severe: slope	Slight	Moderate: slope
Adair	40	Severe: wetness	Moderate: slope wetness	Severe: slope wetness	Moderate: wetness	Moderate: slope wetness
122:						
Sperry	95	Severe: ponding	Severe: ponding	Severe: ponding	Severe: ponding	Severe: ponding
133:						
Colo	95	Severe: flooding wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
133+:						
Colo	90	Severe: flooding wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
133B:						
Colo	90	Severe: flooding wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
163E:						
Fayette	90	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
163E2:						
Fayette	90	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope
163F:						
Fayette	90	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
179D2:						
Gara	90	Moderate: percs slowly slope	Moderate: percs slowly slope	Severe: slope	Slight	Moderate: slope

Table 12.--Recreational Development--Continued

Map symbol and soil name	Percent of map unit	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
179E:						
Gara	95	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
179E2:						
Gara	90	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
179F2:						
Gara	95	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
180:						
Keomah	95	Severe: wetness	Moderate: percs slowly wetness	Severe: wetness	Moderate: wetness	Moderate: wetness
220:						
Nodaway	90	Severe: flooding	Slight	Moderate: flooding	Slight	Moderate: flooding
222C:						
Clarinda	90	Severe: percs slowly wetness	Severe: percs slowly wetness	Severe: percs slowly slope wetness	Severe: erodes easily wetness	Severe: wetness
222C2:						
Clarinda	90	Severe: percs slowly wetness	Severe: percs slowly wetness	Severe: percs slowly slope wetness	Severe: erodes easily wetness	Severe: wetness
223C2:						
Rinda	90	Severe: percs slowly wetness	Severe: percs slowly wetness	Severe: percs slowly slope wetness	Severe: erodes easily wetness	Severe: wetness
273C:						
Olmitz	95	Slight	Slight	Severe: slope	Slight	Slight
279:						
Taintor	95	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
280:						
Mahaska	95	Severe: wetness	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: wetness
280B:						
Mahaska	90	Severe: wetness	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: wetness
281B:						
Otley	90	Slight	Slight	Moderate: slope	Slight	Slight
281B2:						
Otley	90	Slight	Slight	Moderate: slope	Slight	Slight

Table 12.--Recreational Development--Continued

Map symbol and soil name	Percent of map unit	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
281C:						
Otley	95	Slight	Slight	Severe: slope	Slight	Slight
281C2:						
Otley	90	Slight	Slight	Severe: slope	Slight	Slight
281D2:						
Otley	90	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
293C:						
Chelsea	57	Moderate: too sandy	Moderate: too sandy	Severe: slope	Moderate: too sandy	Moderate: droughty
Fayette	38	Slight	Slight	Severe: slope	Slight	Slight
293D:						
Chelsea	57	Moderate: slope, too sandy	Moderate: slope, too sandy	Severe: slope	Moderate: too sandy	Moderate: slope, droughty
Fayette	38	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
293E:						
Chelsea	57	Severe: slope	Severe: slope	Severe: slope	Moderate: slope, too sandy	Severe: slope
Fayette	38	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
293F:						
Chelsea	57	Severe: slope	Severe: slope	Severe: slope	Moderate: slope, too sandy	Severe: slope
Fayette	38	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
294C:						
Billett	65	Moderate: percs slowly	Moderate: percs slowly	Severe: slope	Slight	Slight
Ladoga	35	Moderate: too sandy	Moderate: too sandy	Severe: slope	Moderate: too sandy	Slight
294D:						
Billett	65	Moderate: percs slowly, slope	Moderate: percs slowly, slope	Severe: slope	Slight	Moderate: slope
Ladoga	35	Moderate: slope	Moderate: slope	Severe: slope	Moderate: too sandy	Moderate: slope
313F2:						
Gosport	95	Severe: percs slowly, slope	Severe: percs slowly, slope	Severe: percs slowly, slope	Severe: erodes easily	Severe: slope

Table 12.--Recreational Development--Continued

Map symbol and soil name	Percent of map unit	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
319E:						
Dunbarton	95	Severe: area reclaim slope thin layer depth to rock	Severe: area reclaim slope thin layer depth to rock	Severe: area reclaim slope thin layer depth to rock	Severe: erodes easily	Severe: area reclaim slope thin layer depth to rock
422:						
Amana	90	Severe: flooding wetness	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: flooding wetness
423D2:						
Bucknell	90	Severe: percs slowly wetness	Severe: percs slowly	Severe: percs slowly slope wetness	Severe: erodes easily	Moderate: slope wetness
424D:						
Lindley	52	Moderate: percs slowly slope	Moderate: percs slowly slope	Severe: slope	Slight	Moderate: slope
Keswick	43	Severe: wetness	Moderate: percs slowly slope wetness	Severe: slope wetness	Moderate: wetness	Moderate: slope wetness
424D2:						
Lindley	52	Moderate: percs slowly slope	Moderate: percs slowly slope	Severe: slope	Slight	Moderate: slope
Keswick	43	Severe: wetness	Moderate: percs slowly slope wetness	Severe: slope wetness	Severe: erodes easily	Moderate: slope wetness
424E2:						
Lindley	48	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
Keswick	42	Severe: slope wetness	Severe: slope	Severe: slope wetness	Severe: erodes easily	Severe: slope
425D:						
Keswick	90	Severe: wetness	Moderate: percs slowly slope wetness	Severe: slope wetness	Moderate: wetness	Moderate: slope wetness
425D2:						
Keswick	90	Severe: wetness	Moderate: percs slowly slope wetness	Severe: slope wetness	Severe: erodes easily	Moderate: slope wetness
428B:						
Ely	95	Severe: wetness	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: wetness

Table 12.--Recreational Development--Continued

Map symbol and soil name	Percent of map unit	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
430:						
Ackmore	90	Severe: flooding wetness	Severe: wetness	Severe: wetness	Moderate: wetness	Moderate: flooding wetness
453:						
Tuskeego	95	Severe: flooding percs slowly wetness	Severe: percs slowly wetness	Severe: percs slowly wetness	Severe: wetness	Severe: wetness
520:						
Coppock	95	Severe: flooding wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
520B:						
Coppock	95	Severe: flooding wetness	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: wetness
570C:						
Nira	95	Slight	Slight	Severe: slope	Slight	Slight
570C2:						
Nira	95	Slight	Slight	Severe: slope	Slight	Slight
571C2:						
Hedrick	89	Slight	Slight	Severe: slope	Slight	Slight
571D2:						
Hedrick	95	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
572C2:						
Inton	90	Slight	Slight	Severe: slope	Severe: erodes easily	Slight
572D2:						
Inton	90	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: slope
587:						
Chequest	90	Severe: flooding wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
587+:						
Chequest	90	Severe: flooding wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
687B:						
Watkins	90	Slight	Slight	Moderate: slope	Slight	Slight
688:						
Koszta	90	Severe: flooding wetness	Moderate: wetness	Severe: wetness	Severe: wetness	Moderate: wetness

Table 12.--Recreational Development--Continued

Map symbol and soil name	Percent of map unit	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
722:						
Nodaway	36	Severe: flooding	Slight	Moderate: flooding	Slight	Moderate: flooding
Ackmore	32	Severe: flooding wetness	Moderate: wetness	Severe: wetness	Slight	Moderate: flooding wetness
Vesser	22	Severe: flooding wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
730B:						
Nodaway	46	Slight	Slight	Moderate: slope	Slight	Slight
Coppock	27	Severe: wetness	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: wetness
Cantril	17	Severe: wetness	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: wetness
779:						
Kalona	95	Severe: wetness	Severe: percs slowly wetness	Severe: wetness	Severe: wetness	Severe: wetness
792C2:						
Armstrong	90	Severe: wetness	Moderate: percs slowly wetness	Severe: slope wetness	Moderate: wetness	Moderate: wetness
792D2:						
Armstrong	95	Severe: wetness	Moderate: percs slowly slope wetness	Severe: slope wetness	Moderate: wetness	Moderate: slope wetness
795C2:						
Ashgrove	95	Severe: percs slowly wetness	Severe: percs slowly wetness	Severe: percs slowly slope wetness	Severe: erodes easily wetness	Severe: wetness
795D2:						
Ashgrove	82	Severe: percs slowly wetness	Severe: percs slowly wetness	Severe: percs slowly slope wetness	Severe: erodes easily	Severe: wetness
822D2:						
Lamoni	90	Severe: percs slowly wetness	Severe: percs slowly	Severe: percs slowly slope wetness	Severe: erodes easily	Moderate: slope wetness
876B:						
Ladoga	90	Moderate: percs slowly	Moderate: percs slowly	Moderate: percs slowly slope	Slight	Slight
876C2:						
Ladoga	90	Moderate: percs slowly	Moderate: percs slowly	Severe: slope	Slight	Slight

Table 12.--Recreational Development--Continued

Map symbol and soil name	Percent of map unit	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
876D2:						
Ladoga	90	Moderate: percs slowly slope	Moderate: percs slowly slope	Severe: slope	Slight	Moderate: slope
880B:						
Clinton	95	Moderate: percs slowly	Moderate: percs slowly	Moderate: percs slowly slope	Severe: erodes easily	Slight
880C2:						
Clinton	95	Moderate: percs slowly	Moderate: percs slowly	Severe: slope	Severe: erodes easily	Slight
880D2:						
Clinton	95	Moderate: percs slowly slope	Moderate: percs slowly slope	Severe: slope	Severe: erodes easily	Moderate: slope
881B:						
Otley	95	Slight	Slight	Moderate: slope	Slight	Slight
911B:						
Colo	57	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
Ely	38	Severe: wetness	Moderate: wetness	Moderate: wetness	Moderate: wetness	Moderate: wetness
993D2:						
Gara	48	Moderate: percs slowly slope	Moderate: percs slowly slope	Severe: slope	Slight	Moderate: slope
Armstrong	42	Severe: wetness	Moderate: percs slowly slope wetness	Severe: slope wetness	Moderate: wetness	Moderate: slope wetness
993E2:						
Gara	48	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
Armstrong	42	Severe: slope wetness	Severe: slope	Severe: slope wetness	Moderate: slope wetness	Severe: slope
994D2:						
Galland	65	Severe: wetness	Moderate: percs slowly slope wetness	Severe: slope wetness	Severe: erodes easily	Moderate: slope wetness
Douds	25	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
994E2:						
Galland	55	Severe: slope wetness	Severe: slope	Severe: slope wetness	Severe: erodes easily	Severe: slope
Douds	35	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope

Table 12.--Recreational Development--Continued

Map symbol and soil name	Percent of map unit	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
999F:						
Nordness	62	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Moderate: slope	Severe: slope depth to rock
Eleva	23	Severe: slope	Severe: slope depth to rock	Severe: slope depth to rock	Moderate: slope	Severe: slope
999G:						
Nordness	62	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope	Severe: slope depth to rock
Eleva	23	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
1075:						
Givin	90	Severe: wetness	Moderate: percs slowly wetness	Severe: wetness	Moderate: wetness	Moderate: wetness
1220:						
Nodaway	90	Severe: flooding	Moderate: flooding	Severe: flooding	Moderate: flooding	Severe: flooding
1279:						
Taintor	95	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
1280:						
Mahaska	95	Severe: wetness	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: wetness
1315:						
Nodaway	57	Severe: flooding	Moderate: flooding	Severe: flooding	Moderate: flooding	Severe: flooding
Klum	38	Severe: flooding	Moderate: flooding	Severe: flooding	Moderate: flooding	Severe: flooding
5010:						
Pits, sand and gravel	100	Severe: slope too sandy	Severe: slope too sandy	Severe: slope too sandy	Severe: too sandy	Severe: slope droughty
5020:						
Pits and Dumps	100	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Moderate: slope	Severe: slope depth to rock droughty
5030:						
Pits, limestone quarries	100	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope	Severe: slope depth to rock droughty
5040:						
Orthents, loamy	100	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope

Table 12.--Recreational Development--Continued

Map symbol and soil name	Percent of map unit	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
5048:						
Aquents	100	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness
5060:						
Pits, clay.						
5080:						
Orthents, sanitary landfill	100	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
6051:						
Vesser	93	Severe: flooding wetness	Moderate: flooding wetness	Severe: flooding wetness	Moderate: flooding wetness	Severe: flooding wetness
6054:						
Zook	95	Severe: flooding wetness	Severe: wetness	Severe: flooding wetness	Severe: wetness	Severe: flooding wetness
6133:						
Colo	90	Severe: flooding wetness	Severe: wetness	Severe: flooding wetness	Severe: wetness	Severe: flooding wetness
6133+:						
Colo	90	Severe: flooding wetness	Severe: wetness	Severe: flooding wetness	Severe: wetness	Severe: flooding wetness
6220:						
Nodaway	90	Severe: flooding	Moderate: flooding	Severe: flooding	Moderate: flooding	Severe: flooding
6315:						
Nodaway	57	Severe: flooding	Moderate: flooding	Severe: flooding	Moderate: flooding	Severe: flooding
Klum	38	Severe: flooding	Moderate: flooding	Severe: flooding	Moderate: flooding	Severe: flooding
6422:						
Amana	89	Severe: flooding	Moderate: flooding wetness	Severe: flooding	Moderate: flooding	Severe: flooding
6587:						
Chequest	90	Severe: flooding wetness	Moderate: flooding percs slowly wetness	Severe: flooding wetness	Moderate: flooding wetness	Severe: flooding wetness
AW:						
Animal waste.						
SL:						
Sewage lagoon.						
W:						
Water.						

Table 13.--Wildlife Habitat

(See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Percent of map unit	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
8B:											
Judson	95	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
8C:											
Judson	95	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
13B:											
Olmitz	30	Good	Good	Fair	Good	Good	Poor	Poor	Good	Good	Poor
Vesser	28	Good	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good
Zook	27	Good	Fair	Good	Fair	Poor	Good	Good	Fair	Fair	Good
24D2:											
Shelby	95	Fair	Good	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor
24E2:											
Shelby	90	Poor	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor
51:											
Vesser	90	Good	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good
51B:											
Vesser	95	Good	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good
54:											
Zook	90	Good	Fair	Good	Fair	Poor	Good	Good	Fair	Fair	Good
54+:											
Zook	90	Good	Fair	Good	Fair	Poor	Good	Good	Fair	Fair	Good
56B:											
Cantril	90	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
56C:											
Cantril	90	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
65D2:											
Lindley	95	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
65E:											
Lindley	95	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
65E2:											
Lindley	90	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
65F:											
Lindley	90	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
65F2:											
Lindley	90	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor

Table 13.--Wildlife Habitat--Continued

Map symbol and soil name	Percent of map unit	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
65G:											
Lindley	95	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
74:											
Rubio	95	Good	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good
75:											
Givin	95	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
75B:											
Givin	95	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
76B:											
Ladoga	95	Good	Good	Fair	Good	Good	Poor	Poor	Good	Good	Poor
76B2:											
Ladoga	90	Good	Good	Fair	Good	Good	Poor	Poor	Good	Good	Poor
76C:											
Ladoga	95	Fair	Good	Fair	Good	Good	Very poor	Poor	Fair	Good	Very poor
76C2:											
Ladoga	90	Fair	Good	Fair	Good	Good	Very poor	Poor	Fair	Good	Very poor
76D2:											
Ladoga	90	Fair	Good	Fair	Good	Good	Very poor	Poor	Fair	Good	Very poor
80B:											
Clinton	95	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
80C:											
Clinton	95	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
80C2:											
Clinton	90	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
80D:											
Clinton	90	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
80D2:											
Clinton	90	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
87B:											
Colo	68	Good	Fair	Good	Fair	Poor	Fair	Very poor	Fair	Fair	Good
Zook	32	Good	Fair	Good	Fair	Poor	Good	Good	Fair	Fair	Good
93D2:											
Shelby	60	Fair	Good	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor
Adair	40	Fair	Good	Fair	Fair	Fair	Poor	Poor	Good	Fair	Poor

Table 13.--Wildlife Habitat--Continued

Map symbol and soil name	Percent of map unit	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
122:											
Sperry	95	Fair	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good
133:											
Colo	95	Good	Fair	Good	Fair	Poor	Good	Good	Fair	Fair	Good
133+:											
Colo	90	Good	Fair	Good	Fair	Poor	Good	Good	Fair	Fair	Good
133B:											
Colo	90	Good	Fair	Good	Fair	Poor	Good	Good	Fair	Fair	Good
163E:											
Fayette	90	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
163E2:											
Fayette	90	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
163F:											
Fayette	90	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
179D2:											
Gara	90	Fair	Good	Fair	Good	Good	Very poor	Poor	Fair	Good	Poor
179E:											
Gara	95	Poor	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor
179E2:											
Gara	90	Poor	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor
179F2:											
Gara	95	Poor	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor
180:											
Keomah	95	Good	Good	Fair	Fair	Fair	Fair	Fair	Good	Fair	Fair
220:											
Nodaway	90	Good	Good	Good	Good	Fair	Fair	Poor	Fair	Good	Fair
222C:											
Clarinda	90	Poor	Fair	Poor	Fair	Poor	Poor	Poor	Fair	Fair	Poor
222C2:											
Clarinda	90	Poor	Fair	Poor	Fair	Poor	Poor	Poor	Fair	Fair	Poor
223C2:											
Rinda	90	Poor	Fair	Poor	Fair	Poor	Very poor	Very poor	Fair	Fair	Very poor
273C:											
Olmitz	95	Fair	Good	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor
279:											
Taintor	95	Good	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good

Table 13.--Wildlife Habitat--Continued

Map symbol and soil name	Percent of map unit	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
280:											
Mahaska	95	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
280B:											
Mahaska	90	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
281B:											
Otley	90	Good	Good	Fair	Good	Good	Poor	Poor	Good	Good	Poor
281B2:											
Otley	90	Good	Good	Fair	Good	Good	Poor	Poor	Good	Good	Poor
281C:											
Otley	95	Fair	Good	Fair	Good	Good	Very poor	Poor	Fair	Good	Very poor
281C2:											
Otley	90	Fair	Good	Fair	Good	Good	Very poor	Poor	Fair	Good	Very poor
281D2:											
Otley	90	Fair	Good	Fair	Good	Good	Very poor	Poor	Fair	Good	Very poor
293C:											
Chelsea	57	Poor	Fair	Fair	Poor	Poor	Very poor	Very poor	Fair	Poor	Very poor
Fayette	38	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
293D:											
Chelsea	57	Very poor	Fair	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
Fayette	38	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
293E:											
Chelsea	57	Very poor	Fair	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
Fayette	38	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
293F:											
Chelsea	57	Very poor	Fair	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
Fayette	38	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
294C:											
Billett	65	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Ladoga	35	Poor	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor
294D:											
Billett	65	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor

Table 13.--Wildlife Habitat--Continued

Map symbol and soil name	Percent of map unit	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
294D:											
Ladoga	35	Poor	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor
313F2:											
Gosport	95	Very poor	Poor	Fair	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
319E:											
Dunbarton	95	Poor	Fair	Good	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor
422:											
Amana	90	Good	Good	Good	Good	Fair	Good	Good	Good	Good	Good
423D2:											
Bucknell	90	Fair	Good	Fair	Good	Fair	Poor	Poor	Fair	Good	Very poor
424D:											
Lindley	52	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Keswick	43	Fair	Good	Fair	Good	Fair	Very poor	Poor	Fair	Good	Very poor
424D2:											
Lindley	52	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Keswick	43	Fair	Good	Fair	Good	Fair	Very poor	Poor	Fair	Good	Very poor
424E2:											
Lindley	48	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
Keswick	42	Poor	Fair	Fair	Good	Fair	Very poor	Very poor	Fair	Good	Very poor
425D:											
Keswick	90	Fair	Good	Fair	Good	Fair	Very poor	Poor	Fair	Good	Very poor
425D2:											
Keswick	90	Fair	Good	Fair	Good	Fair	Very poor	Poor	Fair	Good	Very poor
428B:											
Ely	95	Good	Good	Good	Good	Good	Fair	Very poor	Good	Good	Poor
430:											
Ackmore	90	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
453:											
Tuskeego	95	Good	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good
520:											
Coppock	95	Good	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good
520B:											
Coppock	95	Good	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good

Table 13.--Wildlife Habitat--Continued

Map symbol and soil name	Percent of map unit	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hard- wood trees	Conif- erous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Open- land wild- life	Wood- land wild- life	Wetland wild- life
570C:											
Nira	95	Fair	Good	Fair	Good	Good	Very poor	Poor	Fair	Good	Very poor
570C2:											
Nira	95	Fair	Good	Fair	Good	Good	Very poor	Poor	Fair	Good	Very poor
571C2:											
Hedrick	89	Fair	Good	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor
571D2:											
Hedrick	95	Fair	Good	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor
572C2:											
Inton	90	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
572D2:											
Inton	90	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
587:											
Chequest	90	Good	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good
587+:											
Chequest	90	Good	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good
687B:											
Watkins	90	Good	Good	Fair	Good	Good	Poor	Poor	Good	Good	Poor
688:											
Koszta	90	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
722:											
Nodaway	36	Good	Good	Good	Good	Fair	Fair	Poor	Fair	Good	Fair
Ackmore	32	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
Vesser	22	Good	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good
730B:											
Nodaway	46	Good	Good	Good	Good	Fair	Fair	Poor	Fair	Good	Fair
Coppock	27	Good	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good
Cantril	17	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
779:											
Kalona	95	Good	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good
792C2:											
Armstrong	90	Fair	Good	Fair	Good	Fair	Very poor	Very poor	Fair	Good	Very poor
792D2:											
Armstrong	95	Fair	Good	Fair	Good	Fair	Very poor	Very poor	Fair	Good	Very poor
795C2:											
Ashgrove	95	Poor	Fair	Poor	Fair	Poor	Poor	Poor	Fair	Fair	Poor

Table 13.--Wildlife Habitat--Continued

Map symbol and soil name	Percent of map unit	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
795D2:											
Ashgrove	82	Poor	Fair	Poor	Fair	Poor	Poor	Poor	Fair	Fair	Poor
822D2:											
Lamoni	90	Fair	Good	Fair	Fair	Fair	Poor	Poor	Good	Fair	Poor
876B:											
Ladoga	90	Good	Good	Fair	Good	Good	Poor	Poor	Good	Good	Poor
876C2:											
Ladoga	90	Fair	Good	Fair	Good	Good	Very poor	Poor	Fair	Good	Very poor
876D2:											
Ladoga	90	Fair	Good	Fair	Good	Good	Very poor	Poor	Fair	Good	Very poor
880B:											
Clinton	95	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
880C2:											
Clinton	95	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
880D2:											
Clinton	95	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
881B:											
Otley	95	Good	Good	Fair	Good	Good	Poor	Poor	Good	Good	Poor
911B:											
Colo	57	Good	Fair	Good	Fair	Poor	Fair	Very poor	Fair	Fair	Good
Ely	38	Good	Good	Good	Good	Good	Fair	Very poor	Good	Good	Poor
993D2:											
Gara	48	Fair	Good	Fair	Good	Good	Very poor	Poor	Fair	Good	Poor
Armstrong	42	Fair	Good	Fair	Good	Fair	Very poor	Very poor	Fair	Good	Very poor
993E2:											
Gara	48	Poor	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor
Armstrong	42	Poor	Fair	Fair	Good	Fair	Very poor	Very poor	Fair	Good	Very poor
994D2:											
Galland	65	Fair	Good	Fair	Good	Fair	Very poor	Poor	Fair	Good	Very poor
Douds	25	Fair	Good	Fair	Good	Fair	Poor	Poor	Fair	Good	Poor
994E2:											
Galland	55	Poor	Fair	Fair	Good	Fair	Very poor	Very poor	Fair	Good	Very poor

Table 13.--Wildlife Habitat--Continued

Map symbol and soil name	Percent of map unit	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
994E2:											
Douds	35	Very poor	Good	Fair	Good	Fair	Very poor	Very poor	Poor	Good	Very poor
999F:											
Nordness	62	Very poor	Poor	Poor	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
Eleva	23	Very poor	Poor	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
999G:											
Nordness	62	Very poor	Poor	Poor	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
Eleva	23	Very poor	Poor	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
1075:											
Givin	90	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
1220:											
Nodaway	90	Poor	Fair	Fair	Poor	Poor	Good	Fair	Poor	Poor	Fair
1279:											
Taintor	95	Good	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good
1280:											
Mahaska	95	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
1315:											
Nodaway	57	Poor	Fair	Fair	Poor	Poor	Good	Fair	Poor	Poor	Fair
Klum	38	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
5010:											
Pits, sand and gravel	100	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor
5020:											
Pits and Dumps	100	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor
5030:											
Pits, limestone quarries	100	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor
5040:											
Orthents, loamy.											
5048:											
Aquents.											
5060:											
Pits, clay	100	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor
5080:											
Orthents, sanitary landfill.											

Table 13.--Wildlife Habitat--Continued

Map symbol and soil name	Percent of map unit	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
6051:											
Vesser	93	Good	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good
6054:											
Zook	95	Good	Fair	Good	Fair	Poor	Good	Good	Fair	Fair	Good
6133:											
Colo	90	Good	Fair	Good	Fair	Poor	Good	Good	Fair	Fair	Good
6133+:											
Colo	90	Good	Fair	Good	Fair	Poor	Good	Good	Fair	Fair	Good
6220:											
Nodaway	90	Poor	Fair	Fair	Poor	Poor	Good	Fair	Poor	Poor	Fair
6315:											
Nodaway	57	Poor	Fair	Fair	Poor	Poor	Good	Fair	Poor	Poor	Fair
Klum	38	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
6422:											
Amana	89	Good	Good	Good	Good	Fair	Good	Good	Good	Good	Good
6587:											
Chequest	90	Good	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good
AW: Animal waste.											
SL: Sewage lagoon.											
W: Water.											

Table 14.--Building Site Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Percent of map unit	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
8B:							
Judson	95	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: frost action low strength	Slight
8C:							
Judson	95	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: frost action low strength	Slight
13B:							
Olmitz	30	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
Vesser	28	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action low strength	Severe: wetness
Zook	27	Severe: wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: frost action low strength shrink-swell wetness	Severe: wetness
24D2:							
Shelby	95	Moderate: slope	Moderate: shrink-swell slope	Moderate: shrink-swell slope	Severe: slope	Severe: low strength	Moderate: slope
24E2:							
Shelby	90	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope
51:							
Vesser	90	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding frost action low strength wetness	Severe: wetness

Table 14.--Building Site Development--Continued

Map symbol and soil name	Percent of map unit	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
51B:							
Vesser	95	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: frost action low strength	Moderate: wetness
54:							
Zook	90	Severe: wetness	Severe: flooding shrink-swell wetness	Severe: flooding shrink-swell wetness	Severe: flooding shrink-swell wetness	Severe: flooding frost action low strength shrink-swell wetness	Severe: wetness
54+:							
Zook	90	Severe: wetness	Severe: flooding shrink-swell wetness	Severe: flooding shrink-swell wetness	Severe: flooding shrink-swell wetness	Severe: flooding frost action low strength shrink-swell wetness	Severe: wetness
56B:							
Cantril	90	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action low strength	Moderate: wetness
56C:							
Cantril	90	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action low strength	Moderate: wetness
65D2:							
Lindley	95	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Severe: low strength	Moderate: slope
65E:							
Lindley	95	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope
65E2:							
Lindley	90	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope

Table 14.--Building Site Development--Continued

Map symbol and soil name	Percent of map unit	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
65F:							
Lindley	90	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope
65F2:							
Lindley	90	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope
65G:							
Lindley	95	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope
74:							
Rubio	95	Severe: wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: frost action low strength shrink-swell wetness	Severe: wetness
75:							
Givin	95	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action low strength	Moderate: wetness
75B:							
Givin	95	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action low strength	Moderate: wetness
76B:							
Ladoga	95	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
76B2:							
Ladoga	90	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
76C:							
Ladoga	95	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: low strength	Slight

Table 14.--Building Site Development--Continued

Map symbol and soil name	Percent of map unit	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
76C2:							
Ladoga------------------	90	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: low strength	Slight
76D2:							
Ladoga------------------	90	Moderate: slope too clayey wetness	Moderate: shrink-swell slope	Moderate: shrink-swell slope wetness	Severe: slope	Severe: low strength	Moderate: slope
80B:							
Clinton-----------------	95	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
80C:							
Clinton-----------------	95	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: low strength	Slight
80C2:							
Clinton-----------------	90	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: low strength	Slight
80D:							
Clinton-----------------	90	Moderate: slope too clayey wetness	Moderate: shrink-swell slope	Moderate: shrink-swell slope wetness	Severe: slope	Severe: low strength	Moderate: slope
80D2:							
Clinton-----------------	90	Moderate: slope too clayey wetness	Moderate: shrink-swell slope	Moderate: shrink-swell slope wetness	Severe: slope	Severe: low strength	Moderate: slope
87B:							
Colo--------------------	68	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action low strength wetness	Severe: wetness

Table 14.--Building Site Development--Continued

Map symbol and soil name	Percent of map unit	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
87B:							
Zook	32	Severe: wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: frost action low strength shrink-swell wetness	Severe: wetness
93D2:							
Shelby	60	Moderate: slope	Moderate: shrink-swell slope	Moderate: shrink-swell slope	Severe: slope	Severe: low strength	Moderate: slope
Adair	40	Severe: wetness	Severe: shrink-swell wetness	Severe: wetness	Severe: shrink-swell slope wetness	Severe: low strength shrink-swell	Moderate: slope wetness
122:							
Sperry	95	Severe: ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: frost action low strength shrink-swell ponding	Severe: ponding
133:							
Colo	95	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding frost action low strength wetness	Severe: wetness
133+:							
Colo	90	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding frost action low strength wetness	Severe: wetness
133B:							
Colo	90	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: frost action low strength wetness	Severe: wetness

Table 14.--Building Site Development--Continued

Map symbol and soil name	Percent of map unit	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
163E:							
Fayette	90	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: frost action low strength slope	Severe: slope
163E2:							
Fayette	90	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: frost action low strength slope	Severe: slope
163F:							
Fayette	90	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: frost action low strength slope	Severe: slope
179D2:							
Gara	90	Moderate: slope	Moderate: shrink-swell slope	Moderate: shrink-swell slope	Severe: slope	Severe: low strength	Moderate: slope
179E:							
Gara	95	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope
179E2:							
Gara	90	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope
179F2:							
Gara	95	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope
180:							
Keomah	95	Severe: wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: frost action low strength shrink-swell	Moderate: wetness

Table 14.--Building Site Development--Continued

Map symbol and soil name	Percent of map unit	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
220:							
Nodaway	90	Moderate: flooding wetness	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding frost action low strength	Moderate: flooding
222C:							
Clarinda	90	Severe: wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: frost action low strength shrink-swell wetness	Severe: wetness
222C2:							
Clarinda	90	Severe: wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: frost action low strength shrink-swell wetness	Severe: wetness
223C2:							
Rinda	90	Severe: wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: frost action low strength shrink-swell wetness	Severe: wetness
273C:							
Olmitz	95	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: low strength	Slight
279:							
Taintor	95	Severe: wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: frost action low strength shrink-swell wetness	Severe: wetness
280:							
Mahaska	95	Severe: wetness	Moderate: shrink-swell wetness	Severe: wetness	Moderate: shrink-swell wetness	Severe: frost action low strength	Moderate: wetness

Table 14.--Building Site Development--Continued

Map symbol and soil name	Percent of map unit	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
280B:							
Mahaska	90	Severe: wetness	Moderate: shrink-swell wetness	Severe: wetness	Moderate: shrink-swell wetness	Severe: frost action low strength	Moderate: wetness
281B:							
Otley	90	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
281B2:							
Otley	90	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
281C:							
Otley	95	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: low strength	Slight
281C2:							
Otley	90	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: low strength	Slight
281D2:							
Otley	90	Moderate: slope too clayey wetness	Moderate: shrink-swell slope	Moderate: shrink-swell slope wetness	Severe: slope	Severe: low strength	Moderate: slope
293C:							
Chelsea	57	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Slight	Moderate: droughty
Fayette	38	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: frost action low strength	Slight
293D:							
Chelsea	57	Severe: cutbanks cave	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope droughty
Fayette	38	Moderate: slope	Moderate: shrink-swell slope	Moderate: shrink-swell slope	Severe: slope	Severe: frost action low strength	Moderate: slope

Table 14.--Building Site Development--Continued

Map symbol and soil name	Percent of map unit	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
293E:							
Chelsea	57	Severe: slope cutbanks cave	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Fayette	38	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: frost action low strength slope	Severe: slope
293F:							
Chelsea	57	Severe: slope cutbanks cave	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Fayette	38	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: frost action low strength slope	Severe: slope
294C:							
Billett	65	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
Ladoga	35	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
294D:							
Billett	65	Slight	Moderate: slope	Moderate: slope	Severe: slope	Moderate: frost action slope	Moderate: slope
Ladoga	35	Slight	Moderate: slope	Moderate: slope	Severe: slope	Moderate: frost action slope	Moderate: slope
313F2:							
Gosport	95	Severe: slope	Severe: shrink-swell slope	Severe: shrink-swell slope wetness	Severe: shrink-swell slope	Severe: low strength shrink-swell slope	Severe: slope

Table 14.--Building Site Development--Continued

Map symbol and soil name	Percent of map unit	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
319E:							
Dunbarton	95	Severe: slope depth to rock	Severe: shrink-swell slope depth to rock	Severe: shrink-swell slope depth to rock	Severe: shrink-swell slope depth to rock	Severe: low strength shrink-swell slope depth to rock	Severe: area reclaim slope thin layer depth to rock
422:							
Amana	90	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding frost action low strength	Moderate: flooding wetness
423D2:							
Bucknell	90	Severe: wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell slope wetness	Severe: frost action low strength shrink-swell	Moderate: slope wetness
424D:							
Lindley	52	Moderate: slope	Moderate: shrink-swell slope	Moderate: shrink-swell slope	Severe: slope	Severe: low strength	Moderate: slope
Keswick	43	Severe: wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell slope wetness	Severe: frost action low strength shrink-swell	Moderate: slope wetness
424D2:							
Lindley	52	Moderate: slope	Moderate: shrink-swell slope	Moderate: shrink-swell slope	Severe: slope	Severe: low strength	Moderate: slope
Keswick	43	Severe: wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell slope wetness	Severe: frost action low strength shrink-swell	Moderate: slope wetness
424E2:							
Lindley	48	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope

Table 14.--Building Site Development--Continued

Map symbol and soil name	Percent of map unit	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
424E2:							
Keswick	42	Severe: slope wetness	Severe: shrink-swell slope wetness	Severe: shrink-swell slope wetness	Severe: shrink-swell slope wetness	Severe: frost action low strength shrink-swell slope	Severe: slope
425D:							
Keswick	90	Severe: wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell slope wetness	Severe: frost action low strength shrink-swell	Moderate: slope wetness
425D2:							
Keswick	90	Severe: wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell slope wetness	Severe: frost action low strength shrink-swell	Moderate: slope wetness
428B:							
Ely	95	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action low strength	Moderate: wetness
430:							
Ackmore	90	Severe: wetness	Severe: flooding wetness	Severe: flooding shrink-swell wetness	Severe: flooding wetness	Severe: flooding frost action low strength shrink-swell	Moderate: flooding wetness
453:							
Tuskeego	95	Severe: wetness	Severe: flooding shrink-swell wetness	Severe: flooding shrink-swell wetness	Severe: flooding shrink-swell wetness	Severe: flooding frost action low strength shrink-swell wetness	Severe: wetness
520:							
Coppock	95	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding frost action low strength wetness	Severe: wetness

Table 14.--Building Site Development--Continued

Map symbol and soil name	Percent of map unit	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
520B:							
Coppock	95	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: frost action low strength	Moderate: wetness
570C:							
Nira	95	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: frost action low strength	Slight
570C2:							
Nira	95	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: frost action low strength	Slight
571C2:							
Hedrick	89	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: frost action low strength	Slight
571D2:							
Hedrick	95	Moderate: slope wetness	Moderate: shrink-swell slope	Moderate: shrink-swell slope wetness	Severe: slope	Severe: frost action low strength	Moderate: slope
572C2:							
Inton	90	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: frost action low strength	Slight
572D2:							
Inton	90	Moderate: slope wetness	Moderate: shrink-swell slope	Moderate: shrink-swell slope wetness	Severe: slope	Severe: frost action low strength	Moderate: slope
587:							
Chequest	90	Severe: wetness	Severe: flooding shrink-swell wetness	Severe: flooding shrink-swell wetness	Severe: flooding shrink-swell wetness	Severe: flooding frost action low strength shrink-swell wetness	Severe: wetness

Table 14.--Building Site Development--Continued

Map symbol and soil name	Percent of map unit	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
587+:							
Chequest	90	Severe: wetness	Severe: flooding shrink-swell wetness	Severe: flooding shrink-swell wetness	Severe: flooding shrink-swell wetness	Severe: flooding frost action low strength shrink-swell wetness	Severe: wetness
687B:							
Watkins	90	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: frost action low strength	Slight
688:							
Koszta	90	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: frost action low strength	Moderate: wetness
722:							
Nodaway	36	Moderate: flooding wetness	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding frost action low strength	Moderate: flooding
Ackmore	32	Severe: wetness	Severe: flooding wetness	Severe: flooding shrink-swell wetness	Severe: flooding wetness	Severe: flooding frost action low strength shrink-swell	Moderate: flooding wetness
Vesser	22	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding frost action low strength wetness	Severe: wetness
730B:							
Nodaway	46	Moderate: wetness	Slight	Moderate: wetness	Moderate: wetness	Severe: frost action low strength	Slight
Coppock	27	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action low strength	Moderate: wetness

Table 14.--Building Site Development--Continued

Map symbol and soil name	Percent of map unit	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
730B:							
Cantril	17	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action low strength	Moderate: wetness
779:							
Kalona	95	Severe: wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: frost action low strength shrink-swell wetness	Severe: wetness
792C2:							
Armstrong	90	Severe: wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: frost action low strength shrink-swell	Moderate: wetness
792D2:							
Armstrong	95	Severe: wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell slope wetness	Severe: frost action low strength shrink-swell	Moderate: slope wetness
795C2:							
Ashgrove	95	Severe: wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: frost action low strength shrink-swell wetness	Severe: wetness
795D2:							
Ashgrove	82	Severe: wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell slope wetness	Severe: frost action low strength shrink-swell wetness	Severe: wetness
822D2:							
Lamoni	90	Severe: wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell slope wetness	Severe: frost action low strength shrink-swell	Moderate: slope wetness

Table 14.--Building Site Development--Continued

Map symbol and soil name	Percent of map unit	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
876B:							
Ladoga	90	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
876C2:							
Ladoga	90	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: low strength	Slight
876D2:							
Ladoga	90	Moderate: slope too clayey wetness	Moderate: shrink-swell slope	Moderate: shrink-swell slope wetness	Severe: slope	Severe: low strength	Moderate: slope
880B:							
Clinton	95	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
880C2:							
Clinton	95	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: low strength	Slight
880D2:							
Clinton	95	Moderate: slope too clayey wetness	Moderate: shrink-swell slope	Moderate: shrink-swell slope wetness	Severe: slope	Severe: low strength	Moderate: slope
881B:							
Otley	95	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
911B:							
Colo	57	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action low strength wetness	Severe: wetness
Ely	38	Severe: excess humus wetness	Moderate: shrink-swell wetness	Severe: wetness	Moderate: shrink-swell wetness	Severe: frost action low strength	Moderate: wetness

Table 14.--Building Site Development--Continued

Map symbol and soil name	Percent of map unit	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
993D2:							
Gara	48	Moderate: slope	Moderate: shrink-swell slope	Moderate: shrink-swell slope	Severe: slope	Severe: low strength	Moderate: slope
Armstrong	42	Severe: wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell slope wetness	Severe: frost action low strength shrink-swell	Moderate: slope wetness
993E2:							
Gara	48	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope
Armstrong	42	Severe: slope wetness	Severe: shrink-swell slope wetness	Severe: shrink-swell slope wetness	Severe: shrink-swell slope wetness	Severe: frost action low strength shrink-swell slope	Severe: slope
994D2:							
Galland	65	Severe: wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell slope wetness	Severe: frost action low strength shrink-swell	Moderate: slope wetness
Douds	25	Severe: cutbanks cave	Moderate: shrink-swell slope	Moderate: slope wetness	Severe: slope	Moderate: low strength shrink-swell slope	Moderate: slope
994E2:							
Galland	55	Severe: slope wetness	Severe: shrink-swell slope wetness	Severe: shrink-swell slope wetness	Severe: shrink-swell slope wetness	Severe: frost action low strength shrink-swell slope	Severe: slope
Douds	35	Severe: slope cutbanks cave	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope

Table 14.--Building Site Development--Continued

Map symbol and soil name	Percent of map unit	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
999F:							
Nordness	62	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock
Eleva	23	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
999G:							
Nordness	62	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock
Eleva	23	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
1075:							
Givin	90	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action low strength	Moderate: wetness
1220:							
Nodaway	90	Moderate: flooding wetness	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding frost action low strength	Severe: flooding
1279:							
Taintor	95	Severe: wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: frost action low strength shrink-swell wetness	Severe: wetness
1280:							
Mahaska	95	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action low strength	Moderate: wetness
1315:							
Nodaway	57	Moderate: flooding wetness	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding frost action low strength	Severe: flooding

Table 14.--Building Site Development--Continued

Map symbol and soil name	Percent of map unit	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1315:							
Klum	38	Moderate: flooding wetness	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding
5010:							
Pits, sand and gravel	100	Severe: slope cutbanks cave	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope droughty
5020:							
Pits and Dumps	100	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock droughty
5030:							
Pits, limestone quarries	100	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock droughty
5040:							
Orthents, loamy	100	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
5048:							
Aquents	100	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness
5060:							
Pits, clay.							
5080:							
Orthents, sanitary landfill	100	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
6051:							
Vesser	93	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding frost action low strength wetness	Severe: flooding wetness

Table 14.--Building Site Development--Continued

Map symbol and soil name	Percent of map unit	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
6054:							
Zook	95	Severe: wetness	Severe: flooding shrink-swell wetness	Severe: flooding shrink-swell wetness	Severe: flooding shrink-swell wetness	Severe: flooding frost action low strength shrink-swell wetness	Severe: flooding wetness
6133:							
Colo	90	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding frost action low strength wetness	Severe: flooding wetness
6133+:							
Colo	90	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding frost action low strength wetness	Severe: flooding wetness
6220:							
Nodaway	90	Moderate: flooding wetness	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding frost action low strength	Severe: flooding
6315:							
Nodaway	57	Moderate: flooding wetness	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding frost action low strength	Severe: flooding
Klum	38	Moderate: flooding wetness	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding
6422:							
Amana	89	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding frost action low strength	Severe: flooding

Table 14.--Building Site Development--Continued

Map symbol and soil name	Percent of map unit	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
6587:							
Chequest	90	Severe: wetness	Severe: flooding shrink-swell wetness	Severe: flooding shrink-swell wetness	Severe: flooding shrink-swell wetness	Severe: flooding frost action low strength shrink-swell wetness	Severe: flooding wetness
AW: Animal waste.							
SL: Sewage lagoon.							
W: Water.							

Table 15.--Sanitary Facilities

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Percent of map unit	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
8B:						
Judson	95	Moderate: percs slowly	Moderate: seepage slope	Moderate: too clayey	Slight	Fair: too clayey
8C:						
Judson	95	Moderate: percs slowly	Severe: slope	Moderate: too clayey	Slight	Fair: too clayey
13B:						
Olmitz	30	Moderate: percs slowly wetness	Moderate: seepage slope	Severe: wetness	Moderate: wetness	Fair: too clayey
Vesser	28	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Poor: wetness
Zook	27	Severe: percs slowly wetness	Slight	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey wetness
24D2:						
Shelby	95	Severe: percs slowly	Severe: slope	Moderate: slope too clayey	Moderate: slope	Fair: slope too clayey
24E2:						
Shelby	90	Severe: percs slowly slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
51:						
Vesser	90	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Poor: wetness
51B:						
Vesser	95	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Poor: wetness
54:						
Zook	90	Severe: flooding percs slowly wetness	Severe: flooding	Severe: flooding too clayey wetness	Severe: flooding wetness	Poor: hard to pack too clayey wetness
54+:						
Zook	90	Severe: flooding percs slowly wetness	Severe: flooding	Severe: flooding too clayey wetness	Severe: flooding wetness	Poor: hard to pack too clayey wetness
56B:						
Cantril	90	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Poor: wetness

Table 15.--Sanitary Facilities--Continued

Map symbol and soil name	Percent of map unit	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
56C:						
Cantril----------------	90	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Poor: wetness
65D2:						
Lindley----------------	95	Severe: percs slowly	Severe: slope	Moderate: slope too clayey	Moderate: slope	Fair: slope too clayey
65E:						
Lindley----------------	95	Severe: percs slowly slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
65E2:						
Lindley----------------	90	Severe: percs slowly slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
65F:						
Lindley----------------	90	Severe: percs slowly slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
65F2:						
Lindley----------------	90	Severe: percs slowly slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
65G:						
Lindley----------------	95	Severe: percs slowly slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
74:						
Rubio------------------	95	Severe: percs slowly wetness	Severe: wetness	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack wetness
75:						
Givin------------------	95	Severe: percs slowly wetness	Severe: wetness	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey wetness
75B:						
Givin------------------	95	Severe: percs slowly wetness	Severe: wetness	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey wetness
76B:						
Ladoga-----------------	95	Severe: percs slowly	Moderate: seepage slope wetness	Severe: too clayey wetness	Moderate: wetness	Poor: hard to pack too clayey
76B2:						
Ladoga-----------------	90	Severe: percs slowly	Moderate: seepage slope wetness	Severe: too clayey wetness	Moderate: wetness	Poor: hard to pack too clayey

Table 15.--Sanitary Facilities--Continued

Map symbol and soil name	Percent of map unit	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
76C:						
Ladoga	95	Severe: percs slowly	Severe: slope	Severe: too clayey wetness	Moderate: wetness	Poor: hard to pack too clayey
76C2:						
Ladoga	90	Severe: percs slowly	Severe: slope	Severe: too clayey wetness	Moderate: wetness	Poor: hard to pack too clayey
76D2:						
Ladoga	90	Severe: percs slowly	Severe: slope	Severe: too clayey wetness	Moderate: slope wetness	Poor: hard to pack too clayey
80B:						
Clinton	95	Severe: percs slowly	Moderate: seepage slope wetness	Severe: too clayey wetness	Moderate: wetness	Poor: hard to pack too clayey
80C:						
Clinton	95	Severe: percs slowly	Severe: slope	Severe: too clayey wetness	Moderate: wetness	Poor: hard to pack too clayey
80C2:						
Clinton	90	Severe: percs slowly	Severe: slope	Severe: too clayey wetness	Moderate: wetness	Poor: hard to pack too clayey
80D:						
Clinton	90	Severe: percs slowly	Severe: slope	Severe: too clayey wetness	Moderate: slope wetness	Poor: hard to pack too clayey
80D2:						
Clinton	90	Severe: percs slowly	Severe: slope	Severe: too clayey wetness	Moderate: slope wetness	Poor: hard to pack too clayey
87B:						
Colo	68	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Poor: hard to pack wetness
Zook	32	Severe: percs slowly wetness	Moderate: slope	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey wetness
93D2:						
Shelby	60	Severe: percs slowly	Severe: slope	Moderate: slope too clayey	Moderate: slope	Fair: slope too clayey
Adair	40	Severe: percs slowly wetness	Severe: slope	Severe: too clayey wetness	Severe: wetness	Poor: wetness

Table 15.--Sanitary Facilities--Continued

Map symbol and soil name	Percent of map unit	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
122:						
Sperry	95	Severe: percs slowly ponding	Severe: ponding	Severe: ponding	Severe: ponding	Poor: ponding
133:						
Colo	95	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Poor: hard to pack wetness
133+:						
Colo	90	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Poor: hard to pack wetness
133B:						
Colo	90	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Poor: hard to pack wetness
163E:						
Fayette	90	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
163E2:						
Fayette	90	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
163F:						
Fayette	90	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
179D2:						
Gara	90	Severe: percs slowly	Severe: slope	Moderate: slope too clayey	Moderate: slope	Fair: slope too clayey
179E:						
Gara	95	Severe: percs slowly slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
179E2:						
Gara	90	Severe: percs slowly slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
179F2:						
Gara	95	Severe: percs slowly slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
180:						
Keomah	95	Severe: percs slowly wetness	Severe: wetness	Severe: too clayey wetness	Severe: wetness	Poor: wetness
220:						
Nodaway	90	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Fair: too clayey wetness

Table 15.--Sanitary Facilities--Continued

Map symbol and soil name	Percent of map unit	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
222C:						
Clarinda---------------	90	Severe: percs slowly wetness	Severe: slope	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey wetness
222C2:						
Clarinda---------------	90	Severe: percs slowly wetness	Severe: slope	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey wetness
223C2:						
Rinda------------------	90	Severe: percs slowly wetness	Severe: slope	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey wetness
273C:						
Olmitz-----------------	95	Moderate: percs slowly wetness	Severe: slope	Moderate: too clayey	Moderate: wetness	Fair: too clayey
279:						
Taintor----------------	95	Severe: percs slowly wetness	Severe: wetness	Severe: too clayey wetness	Severe: wetness	Poor: wetness
280:						
Mahaska----------------	95	Severe: wetness	Severe: wetness	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey wetness
280B:						
Mahaska----------------	90	Severe: wetness	Severe: wetness	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey wetness
281B:						
Otley------------------	90	Moderate: percs slowly wetness	Moderate: seepage slope wetness	Severe: too clayey wetness	Moderate: wetness	Poor: hard to pack too clayey
281B2:						
Otley------------------	90	Moderate: percs slowly wetness	Moderate: seepage slope wetness	Severe: too clayey wetness	Moderate: wetness	Poor: hard to pack too clayey
281C:						
Otley------------------	95	Moderate: percs slowly wetness	Severe: slope	Severe: too clayey wetness	Moderate: wetness	Poor: hard to pack too clayey
281C2:						
Otley------------------	90	Moderate: percs slowly wetness	Severe: slope	Severe: too clayey wetness	Moderate: wetness	Poor: hard to pack too clayey

Table 15.--Sanitary Facilities--Continued

Map symbol and soil name	Percent of map unit	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
281D2:						
Otley	90	Moderate: percs slowly slope wetness	Severe: slope	Severe: too clayey wetness	Moderate: slope wetness	Poor: hard to pack too clayey
293C:						
Chelsea	57	Severe: poor filter	Severe: seepage slope	Severe: seepage too sandy	Severe: seepage	Poor: seepage too sandy
Fayette	38	Moderate: percs slowly	Severe: slope	Moderate: too clayey	Slight	Fair: too clayey
293D:						
Chelsea	57	Severe: poor filter	Severe: seepage slope	Severe: seepage too sandy	Severe: seepage	Poor: seepage too sandy
Fayette	38	Moderate: percs slowly slope	Severe: slope	Moderate: slope too clayey	Moderate: slope	Fair: slope too clayey
293E:						
Chelsea	57	Severe: slope poor filter	Severe: seepage slope	Severe: seepage slope too sandy	Severe: seepage slope	Poor: seepage slope too sandy
Fayette	38	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
293F:						
Chelsea	57	Severe: slope poor filter	Severe: seepage slope	Severe: seepage slope too sandy	Severe: seepage slope	Poor: seepage slope too sandy
Fayette	38	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
294C:						
Billett	65	Moderate: percs slowly	Severe: seepage slope	Severe: seepage too sandy	Severe: seepage	Poor: seepage
Ladoga	35	Severe: poor filter	Severe: seepage slope	Severe: seepage too sandy	Severe: seepage	Poor: seepage
294D:						
Billett	65	Moderate: percs slowly slope	Severe: seepage slope	Severe: seepage too sandy	Severe: seepage	Poor: seepage
Ladoga	35	Severe: poor filter	Severe: seepage slope	Severe: seepage too sandy	Severe: seepage	Poor: seepage

Table 15.--Sanitary Facilities--Continued

Map symbol and soil name	Percent of map unit	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
313F2:						
Gosport	95	Severe: percs slowly slope wetness depth to rock	Severe: slope depth to rock	Severe: slope wetness depth to rock	Severe: slope wetness depth to rock	Poor: slope depth to rock
319E:						
Dunbarton	95	Severe: seepage slope thin layer depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Poor: area reclaim hard to pack too clayey depth to rock
422:						
Amana	90	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Poor: wetness
423D2:						
Bucknell	90	Severe: percs slowly wetness	Severe: slope	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey wetness
424D:						
Lindley	52	Severe: percs slowly	Severe: slope	Moderate: slope too clayey	Moderate: slope	Fair: slope too clayey
Keswick	43	Severe: percs slowly wetness	Severe: slope	Severe: wetness	Severe: wetness	Poor: wetness
424D2:						
Lindley	52	Severe: percs slowly	Severe: slope	Moderate: slope too clayey	Moderate: slope	Fair: slope too clayey
Keswick	43	Severe: percs slowly wetness	Severe: slope	Severe: wetness	Severe: wetness	Poor: wetness
424E2:						
Lindley	48	Severe: percs slowly slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
Keswick	42	Severe: percs slowly slope wetness	Severe: slope	Severe: slope wetness	Severe: slope wetness	Poor: slope wetness
425D:						
Keswick	90	Severe: percs slowly wetness	Severe: slope	Severe: wetness	Severe: wetness	Poor: wetness
425D2:						
Keswick	90	Severe: percs slowly wetness	Severe: slope	Severe: wetness	Severe: wetness	Poor: wetness

Table 15.--Sanitary Facilities--Continued

Map symbol and soil name	Percent of map unit	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
428B:						
Ely	95	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Poor: wetness
430:						
Ackmore	90	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Poor: hard to pack wetness
453:						
Tuskeego	95	Severe: flooding percs slowly wetness	Severe: flooding	Severe: flooding wetness	Severe: flooding wetness	Poor: hard to pack wetness
520:						
Coppock	95	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Poor: hard to pack wetness
520B:						
Coppock	95	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Poor: hard to pack wetness
570C:						
Nira	95	Severe: wetness	Severe: slope	Severe: wetness	Moderate: wetness	Poor: hard to pack
570C2:						
Nira	95	Severe: wetness	Severe: slope	Severe: wetness	Moderate: wetness	Poor: hard to pack
571C2:						
Hedrick	89	Severe: wetness	Severe: slope	Severe: wetness	Moderate: wetness	Poor: hard to pack
571D2:						
Hedrick	95	Severe: wetness	Severe: slope	Severe: wetness	Moderate: slope wetness	Poor: hard to pack
572C2:						
Inton	90	Severe: wetness	Severe: slope	Severe: wetness	Moderate: wetness	Poor: hard to pack
572D2:						
Inton	90	Severe: wetness	Severe: slope	Severe: wetness	Moderate: slope wetness	Poor: hard to pack
587:						
Chequest	90	Severe: flooding percs slowly wetness	Severe: flooding wetness	Severe: flooding too clayey wetness	Severe: flooding wetness	Poor: hard to pack too clayey wetness
587+:						
Chequest	90	Severe: flooding percs slowly wetness	Severe: flooding wetness	Severe: flooding too clayey wetness	Severe: flooding wetness	Poor: hard to pack too clayey wetness

Table 15.--Sanitary Facilities--Continued

Map symbol and soil name	Percent of map unit	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
687B:						
Watkins	90	Moderate: percs slowly	Moderate: seepage slope	Moderate: too clayey	Slight	Fair: too clayey
688:						
Koszta	90	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Poor: wetness
722:						
Nodaway	36	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Fair: too clayey wetness
Ackmore	32	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Poor: hard to pack wetness
Vesser	22	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Poor: wetness
730B:						
Nodaway	46	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Fair: too clayey wetness
Coppock	27	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Poor: hard to pack wetness
Cantril	17	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Poor: wetness
779:						
Kalona	95	Severe: percs slowly wetness	Severe: wetness	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey wetness
792C2:						
Armstrong	90	Severe: percs slowly wetness	Severe: slope	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey wetness
792D2:						
Armstrong	95	Severe: percs slowly wetness	Severe: slope	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey wetness
795C2:						
Ashgrove	95	Severe: percs slowly wetness	Severe: slope	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey wetness
795D2:						
Ashgrove	82	Severe: percs slowly wetness	Severe: slope	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey wetness

Table 15.--Sanitary Facilities--Continued

Map symbol and soil name	Percent of map unit	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
822D2:						
Lamoni	90	Severe: percs slowly wetness	Severe: slope	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey wetness
876B:						
Ladoga	90	Severe: percs slowly	Moderate: seepage slope wetness	Severe: too clayey wetness	Moderate: wetness	Poor: hard to pack too clayey
876C2:						
Ladoga	90	Severe: percs slowly	Severe: slope	Severe: too clayey wetness	Moderate: wetness	Poor: hard to pack too clayey
876D2:						
Ladoga	90	Severe: percs slowly	Severe: slope	Severe: too clayey wetness	Moderate: slope wetness	Poor: hard to pack too clayey
880B:						
Clinton	95	Severe: percs slowly	Moderate: seepage slope wetness	Severe: too clayey wetness	Moderate: wetness	Poor: hard to pack too clayey
880C2:						
Clinton	95	Severe: percs slowly	Severe: slope	Severe: too clayey wetness	Moderate: wetness	Poor: hard to pack too clayey
880D2:						
Clinton	95	Severe: percs slowly	Severe: slope	Severe: too clayey wetness	Moderate: slope wetness	Poor: hard to pack too clayey
881B:						
Otley	95	Moderate: percs slowly wetness	Moderate: seepage slope wetness	Severe: too clayey wetness	Moderate: wetness	Poor: hard to pack too clayey
911B:						
Colo	57	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Poor: hard to pack wetness
Ely	38	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Fair: too clayey wetness
993D2:						
Gara	48	Severe: percs slowly	Severe: slope	Moderate: slope too clayey	Moderate: slope	Fair: slope too clayey
Armstrong	42	Severe: percs slowly wetness	Severe: slope	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey wetness

Table 15.--Sanitary Facilities--Continued

Map symbol and soil name	Percent of map unit	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
993E2:						
Gara	48	Severe: percs slowly slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
Armstrong	42	Severe: percs slowly slope wetness	Severe: slope	Severe: slope too clayey wetness	Severe: slope wetness	Poor: hard to pack slope too clayey wetness
994D2:						
Galland	65	Severe: percs slowly wetness	Severe: seepage slope	Severe: seepage wetness	Severe: wetness	Poor: hard to pack too clayey wetness
Douds	25	Moderate: percs slowly slope wetness	Severe: seepage slope	Severe: seepage wetness	Severe: seepage	Fair: slope too clayey too sandy
994E2:						
Galland	55	Severe: percs slowly slope wetness	Severe: seepage slope	Severe: seepage slope wetness	Severe: slope wetness	Poor: hard to pack slope too clayey wetness
Douds	35	Severe: slope	Severe: seepage slope	Severe: seepage slope wetness	Severe: seepage slope	Poor: slope
999F:						
Nordness	62	Severe: slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Severe: slope depth to rock
Eleva	23	Severe: slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Severe: slope depth to rock
999G:						
Nordness	62	Severe: slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Severe: slope depth to rock
Eleva	23	Severe: slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Severe: slope depth to rock
1075:						
Givin	90	Severe: percs slowly wetness	Severe: wetness	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey wetness

Table 15.--Sanitary Facilities--Continued

Map symbol and soil name	Percent of map unit	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1220:						
Nodaway	90	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Fair: too clayey wetness
1279:						
Taintor	95	Severe: percs slowly wetness	Severe: wetness	Severe: too clayey wetness	Severe: wetness	Poor: wetness
1280:						
Mahaska	95	Severe: wetness	Severe: wetness	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey wetness
1315:						
Nodaway	57	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Fair: too clayey wetness
Klum	38	Severe: flooding wetness	Severe: flooding seepage wetness	Severe: flooding seepage wetness	Severe: flooding seepage wetness	Poor: seepage
5010:						
Pits, sand and gravel	100	Severe: slope poor filter	Severe: seepage slope	Severe: seepage slope too sandy	Severe: seepage slope	Poor: seepage slope too sandy
5020:						
Pits and Dumps	100	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Poor: slope depth to rock
5030:						
Pits, limestone quarries	100	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Poor: slope depth to rock
5040:						
Orthents, loamy	100	Moderate: percs slowly slope	Moderate: seepage slope	Moderate: slope	Moderate: slope	Fair: slope
5048:						
Aquents	100	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Poor: wetness
5060:						
Pits, clay.						
5080:						
Orthents, sanitary landfill	100	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope	Moderate: slope

Table 15.--Sanitary Facilities--Continued

Map symbol and soil name	Percent of map unit	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
6051:						
Vesser	93	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Poor: wetness
6054:						
Zook	95	Severe: flooding percs slowly wetness	Severe: flooding	Severe: flooding too clayey wetness	Severe: flooding wetness	Poor: hard to pack too clayey wetness
6133:						
Colo	90	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Poor: hard to pack wetness
6133+:						
Colo	90	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Poor: hard to pack wetness
6220:						
Nodaway	90	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Fair: too clayey wetness
6315:						
Nodaway	57	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Fair: too clayey wetness
Klum	38	Severe: flooding wetness	Severe: flooding seepage wetness	Severe: flooding seepage wetness	Severe: flooding seepage wetness	Poor: seepage
6422:						
Amana	89	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Poor: wetness
6587:						
Chequest	90	Severe: flooding percs slowly wetness	Severe: flooding wetness	Severe: flooding too clayey wetness	Severe: flooding wetness	Poor: hard to pack too clayey wetness
AW:						
Animal waste.						
SL:						
Sewage lagoon.						
W:						
Water.						

Table 16.--Construction Materials

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Percent of map unit	Roadfill	Sand	Gravel	Topsoil
8B:					
Judson	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
8C:					
Judson	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
13B:					
Olmitz	30	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: small stones too clayey
Vesser	28	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
Zook	27	Poor: low strength shrink-swell wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey wetness
24D2:					
Shelby	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: slope small stones too clayey
24E2:					
Shelby	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: slope
51:					
Vesser	90	Poor: low strength wetness	Improbable: excess fines	Improbable: excess fines	Poor: wetness
51B:					
Vesser	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
54:					
Zook	90	Poor: low strength shrink-swell wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey wetness
54+:					
Zook	90	Poor: low strength shrink-swell wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey wetness
56B:					
Cantril	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
56C:					
Cantril	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey

Table 16.--Construction Materials--Continued

Map symbol and soil name	Percent of map unit	Roadfill	Sand	Gravel	Topsoil
65D2:					
Lindley	95	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Fair: slope small stones too clayey
65E:					
Lindley	95	Fair: shrink-swell slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
65E2:					
Lindley	90	Fair: shrink-swell slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
65F:					
Lindley	90	Fair: shrink-swell slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
65F2:					
Lindley	90	Fair: shrink-swell slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
65G:					
Lindley	95	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
74:					
Rubio	95	Poor: low strength shrink-swell wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey wetness
75:					
Givin	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
75B:					
Givin	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
76B:					
Ladoga	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
76B2:					
Ladoga	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
76C:					
Ladoga	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
76C2:					
Ladoga	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
76D2:					
Ladoga	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey

Table 16.--Construction Materials--Continued

Map symbol and soil name	Percent of map unit	Roadfill	Sand	Gravel	Topsoil
80B:					
Clinton	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
80C:					
Clinton	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
80C2:					
Clinton	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
80D:					
Clinton	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
80D2:					
Clinton	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
87B:					
Colo	68	Poor: low strength wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey wetness
Zook	32	Poor: low strength shrink-swell wetness	Improbable: excess fines	Improbable: excess fines	Poor: wetness
93D2:					
Shelby	60	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: slope small stones too clayey
Adair	40	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
122:					
Sperry	95	Poor: low strength shrink-swell wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey wetness
133:					
Colo	95	Poor: low strength wetness	Improbable: excess fines	Improbable: excess fines	Poor: wetness
133+:					
Colo	90	Poor: low strength wetness	Improbable: excess fines	Improbable: excess fines	Poor: wetness
133B:					
Colo	90	Poor: low strength wetness	Improbable: excess fines	Improbable: excess fines	Poor: wetness
163E:					
Fayette	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: slope

Table 16.--Construction Materials--Continued

Map symbol and soil name	Percent of map unit	Roadfill	Sand	Gravel	Topsoil
163E2:					
Fayette	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: slope
163F:					
Fayette	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: slope
179D2:					
Gara	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: slope small stones too clayey
179E:					
Gara	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: slope
179E2:					
Gara	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: slope
179F2:					
Gara	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: slope
180:					
Keomah	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
220:					
Nodaway	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
222C:					
Clarinda	90	Poor: low strength shrink-swell wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey wetness
222C2:					
Clarinda	90	Poor: low strength shrink-swell wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey wetness
223C2:					
Rinda	90	Poor: low strength shrink-swell wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey wetness
273C:					
Olmitz	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: small stones too clayey
279:					
Taintor	95	Poor: low strength wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey wetness
280:					
Mahaska	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey

Table 16.--Construction Materials--Continued

Map symbol and soil name	Percent of map unit	Roadfill	Sand	Gravel	Topsoil
280B:					
Mahaska	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
281B:					
Otley	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
281B2:					
Otley	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
281C:					
Otley	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
281C2:					
Otley	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
281D2:					
Otley	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
293C:					
Chelsea	57	Good	Probable	Improbable: too sandy	Poor: too sandy
Fayette	38	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
293D:					
Chelsea	57	Good	Probable	Improbable: too sandy	Poor: too sandy
Fayette	38	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: slope too clayey
293E:					
Chelsea	57	Fair: slope	Probable	Improbable: too sandy	Poor: slope too sandy
Fayette	38	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: slope
293F:					
Chelsea	57	Fair: slope	Probable	Improbable: too sandy	Poor: slope too sandy
Fayette	38	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: slope
294C:					
Billett	65	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Ladoga	35	Good	Probable	Improbable: too sandy	Poor: too sandy

Table 16.--Construction Materials--Continued

Map symbol and soil name	Percent of map unit	Roadfill	Sand	Gravel	Topsoil
294D:					
Billett	65	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Ladoga	35	Good	Probable	Improbable: too sandy	Poor: too sandy
313F2:					
Gosport	95	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope too clayey
319E:					
Dunbarton	95	Poor: area reclaim low strength thin layer depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim slope small stones thin layer depth to rock
422:					
Amana	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
423D2:					
Bucknell	90	Poor: low strength shrink-swell	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
424D:					
Lindley	52	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Fair: slope small stones too clayey
Keswick	43	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
424D2:					
Lindley	52	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Fair: slope small stones too clayey
Keswick	43	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
424E2:					
Lindley	48	Fair: shrink-swell slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
Keswick	42	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: slope too clayey
425D:					
Keswick	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
425D2:					
Keswick	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey

Table 16.--Construction Materials--Continued

Map symbol and soil name	Percent of map unit	Roadfill	Sand	Gravel	Topsoil
428B:					
Ely	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
430:					
Ackmore	90	Poor: low strength shrink-swell	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
453:					
Tuskeego	95	Poor: low strength shrink-swell wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey wetness
520:					
Coppock	95	Poor: low strength wetness	Improbable: excess fines	Improbable: excess fines	Poor: wetness
520B:					
Coppock	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
570C:					
Nira	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
570C2:					
Nira	95	Poor: low strength	Improbable: excess fines	Poor: low strength	Fair: too clayey
571C2:					
Hedrick	89	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
571D2:					
Hedrick	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: slope too clayey
572C2:					
Inton	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
572D2:					
Inton	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: slope too clayey
587:					
Chequest	90	Poor: low strength shrink-swell wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey wetness
587+:					
Chequest	90	Poor: low strength shrink-swell wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey wetness

Table 16.--Construction Materials--Continued

Map symbol and soil name	Percent of map unit	Roadfill	Sand	Gravel	Topsoil
687B:					
Watkins	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
688:					
Koszta	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
722:					
Nodaway	36	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
Ackmore	32	Poor: low strength shrink-swell	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
Vesser	22	Poor: low strength wetness	Improbable: excess fines	Improbable: excess fines	Poor: wetness
730B:					
Nodaway	46	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
Coppock	27	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
Cantril	17	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
779:					
Kalona	95	Poor: low strength shrink-swell wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
792C2:					
Armstrong	90	Poor: low strength shrink-swell	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
792D2:					
Armstrong	95	Poor: low strength shrink-swell	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
795C2:					
Ashgrove	95	Fair: shrink-swell wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey wetness
795D2:					
Ashgrove	82	Poor: shrink-swell wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey wetness
822D2:					
Lamoni	90	Poor: low strength shrink-swell	Improbable: excess fines	Improbable: excess fines	Poor: too clayey

Table 16.--Construction Materials--Continued

Map symbol and soil name	Percent of map unit	Roadfill	Sand	Gravel	Topsoil
876B:					
Ladoga	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
876C2:					
Ladoga	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
876D2:					
Ladoga	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
880B:					
Clinton	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
880C2:					
Clinton	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
880D2:					
Clinton	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
881B:					
Otley	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
911B:					
Colo	57	Poor: low strength wetness	Improbable: excess fines	Improbable: excess fines	Poor: wetness
Ely	38	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
993D2:					
Gara	48	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: slope small stones too clayey
Armstrong	42	Poor: low strength shrink-swell	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
993E2:					
Gara	48	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: slope
Armstrong	42	Poor: low strength shrink-swell	Improbable: excess fines	Improbable: excess fines	Poor: slope too clayey
994D2:					
Galland	65	Fair: wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Douds	25	Good	Improbable: excess fines	Improbable: excess fines	Fair: slope small stones too clayey

Table 16.--Construction Materials--Continued

Map symbol and soil name	Percent of map unit	Roadfill	Sand	Gravel	Topsoil
994E2:					
Galland	55	Fair: slope wetness	Improbable: excess fines	Improbable: excess fines	Poor: slope too clayey
Douds	35	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
999F:					
Nordness	62	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope depth to rock
Eleva	23	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope depth to rock
999G:					
Nordness	62	Poor: slope depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope depth to rock
Eleva	23	Poor: slope depth to rock	Improbable: thin layer	Improbable: excess fines	Poor: slope
1075:					
Givin	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
1220:					
Nodaway	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
1279:					
Taintor	95	Poor: low strength wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey wetness
1280:					
Mahaska	95	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
1315:					
Nodaway	57	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
Klum	38	Good	Probable	Improbable: too sandy	Good
5010:					
Pits, sand and gravel	100	Good	Probable	Probable	Poor: slope too sandy
5020:					
Pits and Dumps	100	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope depth to rock
5030:					
Pits, limestone quarries	100	Poor: slope depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope depth to rock

Table 16.--Construction Materials--Continued

Map symbol and soil name	Percent of map unit	Roadfill	Sand	Gravel	Topsoil
5040:					
Orthents, loamy	100	Good	Improbable: excess fines	Improbable: excess fines	Poor: slope
5048: Aquents.					
5060: Pits, clay.					
5080:					
Orthents, sanitary landfill	100	Poor: thin layer	Improbable: excess fines	Improbable: excess fines	Poor: slope
6051:					
Vesser	93	Poor: low strength wetness	Improbable: excess fines	Improbable: excess fines	Poor: wetness
6054:					
Zook	95	Poor: low strength shrink-swell wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey wetness
6133:					
Colo	90	Poor: low strength wetness	Improbable: excess fines	Improbable: excess fines	Poor: wetness
6133+:					
Colo	90	Poor: low strength wetness	Improbable: excess fines	Improbable: excess fines	Poor: wetness
6220:					
Nodaway	90	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
6315:					
Nodaway	57	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
Klum	38	Good	Probable	Improbable: too sandy	Good
6422:					
Amana	89	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
6587:					
Chequest	90	Poor: low strength shrink-swell wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey wetness
AW: Animal waste.					
SL: Sewage lagoon.					

Table 16.--Construction Materials--Continued

Map symbol and soil name	Percent of map unit	Roadfill	Sand	Gravel	Topsoil
W:					
Water.					

Table 17.--Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Percent of map unit	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
8B:								
Judson	95	Moderate: seepage slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
8C:								
Judson	95	Moderate: seepage slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
13B:								
Olmitz	30	Moderate: seepage slope	Slight	Moderate: slow refill deep to water	Limitation: deep to water	Limitation: slope	Favorable	Favorable
Vesser	28	Moderate: seepage slope	Severe: wetness	Moderate: slow refill	Limitation: frost action slope	Limitation: slope wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
Zook	27	Slight	Severe: hard to pack wetness	Severe: slow refill	Limitation: frost action percs slowly	Limitation: percs slowly wetness	Limitation: erodes easily percs slowly wetness	Limitation: erodes easily percs slowly wetness
24D2:								
Shelby	95	Severe: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
24E2:								
Shelby	90	Severe: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
51:								
Vesser	90	Moderate: seepage	Severe: wetness	Moderate: slow refill	Limitation: flooding frost action	Limitation: flooding wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
51B:								
Vesser	95	Moderate: seepage slope	Severe: wetness	Moderate: slow refill	Limitation: frost action slope	Limitation: slope wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness

Table 17.--Water Management--Continued

Map symbol and soil name	Percent of map unit	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
54:								
Zook	90	Slight	Severe: hard to pack wetness	Severe: slow refill	Limitation: flooding frost action percs slowly	Limitation: percs slowly wetness	Limitation: erodes easily percs slowly wetness	Limitation: erodes easily percs slowly wetness
54+:								
Zook	90	Slight	Severe: hard to pack wetness	Severe: slow refill	Limitation: percs slowly flooding frost action	Limitation: wetness percs slowly	Limitation: erodes easily wetness percs slowly	Limitation: wetness erodes easily percs slowly
56B:								
Cantril	90	Moderate: seepage slope	Severe: wetness	Moderate: slow refill	Limitation: frost action slope	Limitation: rooting depth slope wetness	Limitation: wetness	Limitation: rooting depth wetness
56C:								
Cantril	90	Moderate: seepage slope	Severe: wetness	Moderate: slow refill	Limitation: frost action slope	Limitation: rooting depth slope wetness	Limitation: wetness	Limitation: rooting depth wetness
65D2:								
Lindley	95	Severe: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
65E:								
Lindley	95	Severe: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
65E2:								
Lindley	90	Severe: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
65F:								
Lindley	90	Severe: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
65F2:								
Lindley	90	Severe: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope

Table 17.--Water Management--Continued

Map symbol and soil name	Percent of map unit	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
65G:								
Lindley	95	Severe: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
74:								
Rubio	95	Slight	Severe: wetness	Severe: slow refill	Limitation: frost action percs slowly	Limitation: erodes easily percs slowly wetness	Limitation: erodes easily wetness	Limitation: erodes easily percs slowly wetness
75:								
Givin	95	Slight	Severe: wetness	Severe: slow refill	Limitation: frost action	Limitation: wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
75B:								
Givin	95	Moderate: slope	Severe: wetness	Severe: slow refill	Limitation: frost action slope	Limitation: slope wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
76B:								
Ladoga	95	Moderate: seepage slope	Moderate: hard to pack	Severe: slow refill	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
76B2:								
Ladoga	90	Moderate: seepage slope	Moderate: hard to pack	Severe: slow refill	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
76C:								
Ladoga	95	Moderate: seepage slope	Moderate: hard to pack	Severe: slow refill	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
76C2:								
Ladoga	90	Moderate: seepage slope	Moderate: hard to pack	Severe: slow refill	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
76D2:								
Ladoga	90	Severe: slope	Moderate: hard to pack	Severe: slow refill	Limitation: deep to water	Limitation: slope	Limitation: erodes easily slope	Limitation: erodes easily slope

Table 17.--Water Management--Continued

Map symbol and soil name	Percent of map unit	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
80B:								
Clinton	95	Moderate: seepage slope	Moderate: hard to pack	Severe: slow refill	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily	Limitation: erodes easily
80C:								
Clinton	95	Moderate: seepage slope	Moderate: hard to pack	Severe: slow refill	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily	Limitation: erodes easily
80C2:								
Clinton	90	Moderate: seepage slope	Moderate: hard to pack	Severe: slow refill	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily	Limitation: erodes easily
80D:								
Clinton	90	Severe: slope	Moderate: hard to pack	Severe: slow refill	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily slope	Limitation: erodes easily slope
80D2:								
Clinton	90	Severe: slope	Moderate: hard to pack	Severe: slow refill	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily slope	Limitation: erodes easily slope
87B:								
Colo	68	Moderate: seepage	Severe: wetness	Moderate: slow refill	Limitation: frost action	Limitation: wetness	Limitation: wetness	Limitation: wetness
Zook	32	Slight	Severe: hard to pack wetness	Severe: slow refill	Limitation: frost action percs slowly	Limitation: percs slowly wetness	Limitation: erodes easily percs slowly wetness	Limitation: erodes easily percs slowly wetness
93D2:								
Shelby	60	Severe: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
Adair	40	Severe: slope	Severe: hard to pack	Severe: slow refill	Limitation: frost action percs slowly slope	Limitation: percs slowly slope wetness	Limitation: erodes easily slope wetness	Limitation: percs slowly slope wetness

Table 17.--Water Management--Continued

Map symbol and soil name	Percent of map unit	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
122:								
Sperry	95	Slight	Severe: ponding	Severe: slow refill	Limitation: frost action percs slowly ponding	Limitation: erodes easily percs slowly ponding	Limitation: erodes easily ponding	Limitation: erodes easily percs slowly wetness
133:								
Colo	95	Moderate: seepage	Severe: wetness	Moderate: slow refill	Limitation: flooding frost action	Limitation: flooding wetness	Limitation: wetness	Limitation: wetness
133+:								
Colo	90	Moderate: seepage	Severe: wetness	Moderate: slow refill	Limitation: flooding frost action	Limitation: flooding wetness	Limitation: wetness	Limitation: wetness
133B:								
Colo	90	Moderate: seepage slope	Severe: wetness	Moderate: slow refill	Limitation: frost action slope	Limitation: slope wetness	Limitation: wetness	Limitation: wetness
163E:								
Fayette	90	Severe: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily slope	Limitation: erodes easily slope
163E2:								
Fayette	90	Severe: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily slope	Limitation: erodes easily slope
163F:								
Fayette	90	Severe: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily slope	Limitation: erodes easily slope
179D2:								
Gara	90	Severe: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: rooting depth slope	Limitation: slope	Limitation: rooting depth slope
179E:								
Gara	95	Severe: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: rooting depth slope	Limitation: slope	Limitation: rooting depth slope

Table 17.--Water Management--Continued

Map symbol and soil name	Percent of map unit	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
179E2:								
Gara	90	Severe: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: rooting depth slope	Limitation: slope	Limitation: rooting depth slope
179F2:								
Gara	95	Severe: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: rooting depth slope	Limitation: slope	Limitation: rooting depth slope
180:								
Keomah	95	Slight	Severe: wetness	Severe: slow refill	Limitation: frost action percs slowly	Limitation: percs slowly wetness	Limitation: erodes easily wetness	Limitation: erodes easily percs slowly wetness
220:								
Nodaway	90	Moderate: seepage	Severe: piping	Moderate: slow refill deep to water	Limitation: deep to water	Limitation: flooding	Limitation: erodes easily	Limitation: erodes easily
222C:								
Clarinda	90	Moderate: slope	Severe: hard to pack wetness	Severe: slow refill	Limitation: frost action percs slowly slope	Limitation: percs slowly slope wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
222C2:								
Clarinda	90	Moderate: slope	Severe: hard to pack wetness	Severe: slow refill	Limitation: frost action percs slowly slope	Limitation: percs slowly slope wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
223C2:								
Rinda	90	Moderate: slope	Severe: hard to pack wetness	Severe: slow refill	Limitation: frost action percs slowly slope	Limitation: percs slowly slope wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
273C:								
Olmitz	95	Moderate: seepage slope	Slight	Moderate: slow refill deep to water	Limitation: deep to water	Limitation: slope	Favorable	Favorable

Table 17.--Water Management--Continued

Map symbol and soil name	Percent of map unit	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
279:								
Taintor	95	Moderate: seepage	Severe: wetness	Severe: slow refill	Limitation: frost action	Limitation: wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
280:								
Mahaska	95	Moderate: seepage	Severe: hard to pack wetness	Moderate: slow refill	Limitation: frost action	Limitation: wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
280B:								
Mahaska	90	Moderate: seepage slope	Severe: hard to pack wetness	Moderate: slow refill	Limitation: frost action slope	Limitation: slope wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
281B:								
Otley	90	Moderate: seepage slope	Moderate: hard to pack	Moderate: slow refill deep to water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
281B2:								
Otley	90	Moderate: seepage slope	Moderate: hard to pack	Moderate: slow refill deep to water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
281C:								
Otley	95	Moderate: seepage slope	Moderate: hard to pack	Moderate: slow refill deep to water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
281C2:								
Otley	90	Moderate: seepage slope	Moderate: hard to pack	Moderate: slow refill deep to water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
281D2:								
Otley	90	Severe: slope	Moderate: hard to pack	Moderate: slow refill deep to water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily slope	Limitation: erodes easily slope
293C:								
Chelsea	57	Severe: seepage	Severe: seepage piping	Severe: no water	Limitation: deep to water	Limitation: fast intake slope droughty	Limitation: too sandy soil blowing	Limitation: droughty

Table 17.--Water Management--Continued

Map symbol and soil name	Percent of map unit	Limitations for--			Features affecting--			
		Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
293C:								
Fayette	38	Moderate: seepage slope	Slight	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
293D:								
Chelsea	57	Severe: seepage slope	Severe: seepage piping	Severe: no water	Limitation: deep to water	Limitation: fast intake slope droughty	Limitation: slope too sandy soil blowing	Limitation: slope droughty
Fayette	38	Severe: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily slope	Limitation: erodes easily slope
293E:								
Chelsea	57	Severe: seepage slope	Severe: seepage piping	Severe: no water	Limitation: deep to water	Limitation: fast intake slope droughty	Limitation: slope too sandy soil blowing	Limitation: slope droughty
Fayette	38	Severe: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily slope	Limitation: erodes easily slope
293F:								
Chelsea	57	Severe: seepage slope	Severe: seepage piping	Severe: no water	Limitation: deep to water	Limitation: fast intake slope droughty	Limitation: slope too sandy soil blowing	Limitation: slope droughty
Fayette	38	Severe: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily slope	Limitation: erodes easily slope
294C:								
Billett	65	Severe: seepage	Severe: seepage piping	Severe: no water	Limitation: deep to water	Limitation: slope soil blowing	Limitation: too sandy soil blowing	Limitation: favorable
Ladoga	35	Severe: seepage	Severe: seepage piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily

Table 17.--Water Management--Continued

Map symbol and soil name	Percent of map unit	Limitations for--			Features affecting--			
		Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
294D:								
Billett	65	Severe: seepage slope	Severe: seepage piping	Severe: no water	Limitation: deep to water	Limitation: slope soil blowing	Limitation: slope too sandy soil blowing	Limitation: slope
Ladoga	35	Severe: seepage slope	Severe: seepage piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
313F2:								
Gosport	95	Severe: slope	Moderate: wetness	Severe: slow refill	Limitation: deep to water	Limitation: percs slowly slope depth to rock	Limitation: erodes easily slope depth to rock	Limitation: erodes easily slope depth to rock
319E:								
Dunbarton	95	Severe: seepage slope depth to rock	Severe: hard to pack thin layer	Severe: no water	Limitation: deep to water	Limitation: erodes easily slope thin layer depth to rock	Limitation: area reclaim slope depth to rock	Limitation: erodes easily slope depth to rock
422:								
Amana	90	Moderate: seepage	Severe: wetness	Moderate: slow refill	Limitation: flooding frost action	Limitation: flooding wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
423D2:								
Bucknell	90	Severe: slope	Moderate: hard to pack wetness	Severe: slow refill	Limitation: frost action percs slowly slope	Limitation: percs slowly slope wetness	Limitation: erodes easily slope wetness	Limitation: erodes easily slope wetness
424D:								
Lindley	52	Severe: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
Keswick	43	Severe: slope	Moderate: wetness	Severe: slow refill	Limitation: frost action percs slowly slope	Limitation: percs slowly slope wetness	Limitation: erodes easily slope wetness	Limitation: erodes easily percs slowly slope wetness

Table 17.--Water Management--Continued

Map symbol and soil name	Percent of map unit	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
424D2:								
Lindley	52	Severe: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
Keswick	43	Severe: slope	Moderate: wetness	Severe: slow refill	Limitation: frost action percs slowly slope	Limitation: percs slowly slope wetness	Limitation: erodes easily slope wetness	Limitation: erodes easily percs slowly slope wetness
424E2:								
Lindley	48	Severe: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
Keswick	42	Severe: slope	Moderate: wetness	Severe: slow refill	Limitation: frost action percs slowly slope	Limitation: percs slowly slope wetness	Limitation: erodes easily slope wetness	Limitation: erodes easily percs slowly slope wetness
425D:								
Keswick	90	Severe: slope	Moderate: wetness	Severe: slow refill	Limitation: frost action percs slowly slope	Limitation: percs slowly slope wetness	Limitation: erodes easily slope wetness	Limitation: erodes easily percs slowly slope wetness
425D2:								
Keswick	90	Severe: slope	Moderate: wetness	Severe: slow refill	Limitation: frost action percs slowly slope	Limitation: percs slowly slope wetness	Limitation: erodes easily slope wetness	Limitation: erodes easily percs slowly slope wetness
428B:								
Ely	95	Moderate: seepage slope	Severe: wetness	Moderate: slow refill	Limitation: frost action slope	Limitation: slope wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
430:								
Ackmore	90	Moderate: seepage	Severe: wetness	Moderate: slow refill	Limitation: flooding frost action	Limitation: flooding wetness	Limitation: wetness	Limitation: wetness

Table 17.--Water Management--Continued

Map symbol and soil name	Percent of map unit	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
453:								
Tuskeego	95	Slight	Severe: wetness	Severe: slow refill	Limitation: flooding frost action percs slowly	Limitation: percs slowly wetness	Limitation: erodes easily percs slowly wetness	Limitation: erodes easily percs slowly wetness
520:								
Coppock	95	Moderate: seepage	Severe: hard to pack wetness	Moderate: slow refill	Limitation: flooding frost action	Limitation: wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
520B:								
Coppock	95	Moderate: seepage slope	Severe: hard to pack wetness	Moderate: slow refill	Limitation: frost action slope	Limitation: slope wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
570C:								
Nira	95	Moderate: seepage slope	Moderate: hard to pack	Moderate: slow refill deep to water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
570C2:								
Nira	95	Moderate: seepage slope	Moderate: hard to pack	Moderate: slow refill deep to water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
571C2:								
Hedrick	89	Moderate: seepage slope	Moderate: hard to pack	Moderate: slow refill deep to water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
571D2:								
Hedrick	95	Severe: slope	Moderate: hard to pack	Moderate: slow refill deep to water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily slope	Limitation: erodes easily slope
572C2:								
Inton	90	Moderate: seepage slope	Moderate: hard to pack	Moderate: slow refill deep to water	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily	Limitation: erodes easily
572D2:								
Inton	90	Severe: slope	Moderate: hard to pack	Moderate: slow refill deep to water	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily slope	Limitation: erodes easily slope

Table 17.--Water Management--Continued

Map symbol and soil name	Percent of map unit	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
587:								
Chequest	90	Slight	Severe: wetness	Severe: slow refill	Limitation: flooding frost action	Limitation: flooding wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
587+:								
Chequest	90	Slight	Severe: wetness	Severe: slow refill	Limitation: flooding frost action	Limitation: erodes easily flooding wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
687B:								
Watkins	90	Moderate: seepage slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
688:								
Koszta	90	Moderate: seepage	Severe: wetness	Moderate: slow refill	Limitation: frost action	Limitation: wetness	Limitation: erodes easily wetness	Limitation: wetness
722:								
Nodaway	36	Moderate: seepage	Severe: piping	Moderate: slow refill deep to water	Limitation: deep to water	Limitation: flooding	Limitation: erodes easily	Limitation: erodes easily
Ackmore	32	Moderate: seepage	Severe: wetness	Moderate: slow refill	Limitation: flooding frost action	Limitation: flooding wetness	Limitation: wetness	Limitation: wetness
Vesser	22	Moderate: seepage	Severe: wetness	Moderate: slow refill	Limitation: flooding frost action	Limitation: flooding wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
730B:								
Nodaway	46	Moderate: seepage slope	Severe: piping	Moderate: slow refill deep to water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
Coppock	27	Moderate: seepage slope	Severe: hard to pack wetness	Moderate: slow refill	Limitation: frost action slope	Limitation: slope wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
Cantril	17	Moderate: seepage slope	Severe: wetness	Moderate: slow refill	Limitation: frost action slope	Limitation: rooting depth slope wetness	Limitation: wetness	Limitation: rooting depth wetness

Table 17.--Water Management--Continued

Map symbol and soil name	Percent of map unit	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
779:								
Kalona	95	Slight	Severe: wetness	Severe: slow refill	Limitation: frost action	Limitation: wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
792C2:								
Armstrong	90	Moderate: slope	Severe: hard to pack	Severe: slow refill	Limitation: frost action percs slowly slope	Limitation: percs slowly slope wetness	Limitation: percs slowly wetness	Limitation: erodes easily percs slowly wetness
792D2:								
Armstrong	95	Severe: slope	Severe: hard to pack	Severe: slow refill	Limitation: frost action percs slowly slope	Limitation: percs slowly slope wetness	Limitation: percs slowly slope wetness	Limitation: percs slowly slope wetness
795C2:								
Ashgrove	95	Moderate: slope	Severe: wetness	Severe: slow refill	Limitation: frost action percs slowly slope	Limitation: percs slowly slope wetness	Limitation: erodes easily wetness	Limitation: erodes easily percs slowly wetness
795D2:								
Ashgrove	82	Severe: slope	Severe: wetness	Severe: slow refill	Limitation: frost action percs slowly slope	Limitation: percs slowly slope wetness	Limitation: erodes easily slope wetness	Limitation: erodes easily percs slowly slope wetness
822D2:								
Lamoni	90	Severe: slope	Moderate: hard to pack wetness	Severe: slow refill	Limitation: frost action percs slowly slope	Limitation: percs slowly slope wetness	Limitation: erodes easily slope wetness	Limitation: erodes easily percs slowly slope wetness
876B:								
Ladoga	90	Moderate: seepage slope	Moderate: hard to pack	Severe: slow refill	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
876C2:								
Ladoga	90	Moderate: seepage slope	Moderate: hard to pack	Severe: slow refill	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily

Table 17.--Water Management--Continued

Map symbol and soil name	Percent of map unit	Limitations for--			Features affecting--			
		Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
876D2:								
Ladoga	90	Severe: slope	Moderate: hard to pack	Severe: slow refill	Limitation: deep to water	Limitation: slope	Limitation: erodes easily slope	Limitation: erodes easily slope
880B:								
Clinton	95	Moderate: seepage slope	Moderate: hard to pack	Severe: slow refill	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily	Limitation: erodes easily
880C2:								
Clinton	95	Moderate: seepage slope	Moderate: hard to pack	Severe: slow refill	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily	Limitation: erodes easily
880D2:								
Clinton	95	Severe: slope	Moderate: hard to pack	Severe: slow refill	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily slope	Limitation: erodes easily slope
881B:								
Otley	95	Moderate: seepage slope	Moderate: hard to pack	Moderate: slow refill deep to water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
911B:								
Colo	57	Moderate: seepage slope	Severe: wetness	Moderate: slow refill	Limitation: frost action slope	Limitation: slope wetness	Limitation: wetness	Limitation: wetness
Ely	38	Moderate: seepage slope	Moderate: piping wetness	Moderate: slow refill	Limitation: frost action slope	Limitation: slope wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
993D2:								
Gara	48	Severe: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: rooting depth slope	Limitation: slope	Limitation: rooting depth slope
Armstrong	42	Severe: slope	Severe: hard to pack	Severe: slow refill	Limitation: frost action percs slowly slope	Limitation: percs slowly slope wetness	Limitation: percs slowly slope wetness	Limitation: erodes easily percs slowly slope wetness

Table 17.--Water Management--Continued

Map symbol and soil name	Percent of map unit	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
993E2:								
Gara	48	Severe: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: rooting depth slope	Limitation: slope	Limitation: rooting depth slope
Armstrong	42	Severe: slope	Severe: hard to pack	Severe: slow refill	Limitation: frost action percs slowly slope	Limitation: percs slowly slope wetness	Limitation: percs slowly slope wetness	Limitation: erodes easily percs slowly slope wetness
994D2:								
Galland	65	Severe: seepage slope	Moderate: hard to pack thin layer wetness	Severe: slow refill	Limitation: frost action percs slowly slope	Limitation: percs slowly slope wetness	Limitation: erodes easily slope wetness	Limitation: erodes easily percs slowly slope wetness
Douds	25	Severe: seepage slope	Severe: piping	Severe: cutbanks cave	Limitation: deep to water	Limitation: rooting depth slope	Limitation: slope too sandy	Limitation: rooting depth slope
994E2:								
Galland	55	Severe: seepage slope	Moderate: hard to pack thin layer wetness	Severe: slow refill	Limitation: frost action percs slowly slope	Limitation: percs slowly slope wetness	Limitation: erodes easily slope wetness	Limitation: erodes easily percs slowly slope wetness
Douds	35	Severe: seepage slope	Severe: piping	Severe: cutbanks cave	Limitation: deep to water	Limitation: rooting depth slope	Limitation: slope too sandy	Limitation: rooting depth slope
999F:								
Nordness	62	Severe: slope depth to rock	Severe: piping thin layer	Severe: no water depth to rock	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
Eleva	23	Severe: seepage slope	Severe: piping thin layer	Severe: no water depth to rock	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope too sandy depth to rock	Limitation: slope depth to rock

Table 17.--Water Management--Continued

Map symbol and soil name	Percent of map unit	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
999G:								
Nordness	62	Severe: slope depth to rock	Severe: piping thin layer	Severe: no water depth to rock	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
Eleva	23	Severe: seepage slope	Severe: piping thin layer	Severe: no water depth to rock	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope too sandy depth to rock	Limitation: slope depth to rock
1075:								
Givin	90	Slight	Severe: wetness	Severe: slow refill	Limitation: frost action	Limitation: wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
1220:								
Nodaway	90	Moderate: seepage	Severe: piping	Moderate: slow refill deep to water	Limitation: deep to water	Limitation: flooding	Limitation: erodes easily	Limitation: erodes easily
1279:								
Taintor	95	Moderate: seepage	Severe: wetness	Severe: slow refill	Limitation: frost action	Limitation: wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
1280:								
Mahaska	95	Moderate: seepage	Severe: hard to pack wetness	Moderate: slow refill	Limitation: frost action	Limitation: wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
1315:								
Nodaway	57	Moderate: seepage	Severe: piping	Moderate: slow refill deep to water	Limitation: deep to water	Limitation: flooding	Limitation: erodes easily	Limitation: erodes easily
Klum	38	Severe: seepage	Severe: seepage piping	Severe: cutbanks cave	Limitation: deep to water	Limitation: flooding soil blowing	Limitation: soil blowing	Favorable
5010:								
Pits, sand and gravel	100	Severe: seepage slope	Severe: seepage piping	Severe: no water	Limitation: deep to water	Limitation: fast intake slope droughty	Limitation: slope too sandy	Limitation: slope droughty

Table 17.--Water Management--Continued

Map symbol and soil name	Percent of map unit	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
5020: Pits and Dumps	100	Severe: slope depth to rock	Slight	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
5030: Pits, limestone quarries	100	Severe: slope depth to rock	Slight	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
5040: Orthents, loamy	100	Moderate: seepage slope	Slight	Severe: no water	Limitation: deep to water	Limitation: slope droughty	Limitation: slope soil blowing	Limitation: slope droughty
5048: Aquents	100	Slight	Severe: wetness	Slight	Limitation: flooding	Limitation: flooding wetness	Limitation: wetness	Limitation: wetness
5060: Pits, clay.								
5080: Orthents, sanitary landfill	100	Moderate: seepage slope	Slight	Severe: no water	Limitation: deep to water	Limitation: slope droughty	Limitation: slope soil blowing	Limitation: slope droughty
6051: Vesser	93	Moderate: seepage	Severe: wetness	Moderate: slow refill	Limitation: flooding frost action	Limitation: flooding wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
6054: Zook	95	Slight	Severe: hard to pack wetness	Severe: slow refill	Limitation: flooding frost action percs slowly	Limitation: flooding percs slowly wetness	Limitation: erodes easily percs slowly wetness	Limitation: erodes easily percs slowly wetness
6133: Colo	90	Moderate: seepage	Severe: wetness	Moderate: slow refill	Limitation: flooding frost action	Limitation: flooding wetness	Limitation: wetness	Limitation: wetness

Table 17.--Water Management--Continued

Map symbol and soil name	Percent of map unit	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
6133+:								
Colo	90	Moderate: seepage	Severe: wetness	Moderate: slow refill	Limitation: flooding frost action	Limitation: flooding wetness	Limitation: wetness	Limitation: wetness
6220:								
Nodaway	90	Moderate: seepage	Severe: piping	Moderate: slow refill deep to water	Limitation: deep to water	Limitation: flooding	Limitation: erodes easily	Limitation: erodes easily
6315:								
Nodaway	57	Moderate: seepage	Severe: piping	Moderate: slow refill deep to water	Limitation: deep to water	Limitation: flooding	Limitation: erodes easily	Limitation: erodes easily
Klum	38	Severe: seepage	Severe: seepage piping	Severe: cutbanks cave	Limitation: deep to water	Limitation: flooding soil blowing	Limitation: soil blowing	Favorable
6422:								
Amana	89	Moderate: seepage	Severe: wetness	Moderate: slow refill	Limitation: flooding frost action	Limitation: flooding wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
6587:								
Chequest	90	Slight	Severe: wetness	Severe: slow refill	Limitation: flooding frost action	Limitation: flooding wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
AW: Animal waste.								
SL: Sewage lagoon.								
W: Water.								

Table 18.--Engineering Index Properties

(Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
		In				Pct	Pct					Pct	
8B:													
Judson----------	95	0-28	Silty clay loam	CL, ML	A-6, A-7	0	0	100	100	100	95-100	35-50	10-25
		28-58	Silty clay loam	CL	A-6, A-7	0	0	100	100	100	95-100	30-50	15-25
		58-80	Silty clay loam, silt loam	CL, CL-ML	A-4, A-6, A-7	0	0	100	100	100	95-100	25-50	5-25
8C:													
Judson----------	95	0-25	Silty clay loam	CL, ML	A-6, A-7	0	0	100	100	100	95-100	35-50	10-25
		25-58	Silty clay loam	CL	A-6, A-7	0	0	100	100	100	95-100	30-50	15-25
		58-80	Silty clay loam, silt loam	CL, CL-ML	A-4, A-6, A-7	0	0	100	100	100	95-100	25-50	5-25
13B:													
Olmitz----------	30	0-9	Loam	CL	A-6	0	0	100	90-100	85-95	60-80	30-40	11-20
		9-32	Loam, clay loam	CL	A-6	0	0	100	90-100	85-95	60-80	30-40	11-20
		32-80	Clay loam	CL	A-6, A-7	0	0	100	90-100	85-95	60-80	35-45	15-25
Vesser----------	28	0-12	Silt loam	CL	A-6	0	0	100	100	98-100	95-100	30-40	10-20
		12-31	Silt loam	CL	A-6	0	0	100	100	98-100	95-100	30-40	10-20
		31-80	Silty clay loam	CL	A-7	0	0	100	100	98-100	95-100	40-50	15-25
Zook------------	27	0-9	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	95-100	45-65	20-35
		9-51	Silty clay, silty clay loam	CH	A-7	0	0	100	100	95-100	95-100	60-85	35-55
		51-80	Silty clay loam, silty clay, silt loam	CH, CL, MH, ML	A-6, A-7	0	0	100	100	95-100	95-100	35-80	10-50
24D2:													
Shelby----------	95	0-7	Clay loam	CL	A-6, A-7	0	0	90-95	85-95	75-90	55-70	35-45	15-25
		7-12	Clay loam	CL	A-6, A-7	0	0	90-95	85-95	75-90	55-70	35-45	15-25
		12-52	Clay loam	CL	A-6, A-7	0	0-5	90-95	85-95	75-90	55-70	30-45	15-25
		52-80	Clay loam	CL	A-6, A-7	0	0-5	90-95	85-95	75-90	55-70	30-45	15-25
24E2:													
Shelby----------	90	0-7	Clay loam	CL	A-6, A-7	0	0	90-95	85-95	75-90	55-70	35-45	15-25
		7-12	Clay loam	CL	A-6, A-7	0	0	90-95	85-95	75-90	55-70	35-45	15-25
		12-50	Clay loam	CL	A-6, A-7	0	0-5	90-95	85-95	75-90	55-70	30-45	15-25
		50-80	Clay loam	CL	A-6, A-7	0	0-5	90-95	85-95	75-90	55-70	30-45	15-25

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
		In				Pct	Pct					Pct	
51:													
Vesser----------	90	0-13	Silt loam	CL	A-6	0	0	100	100	98-100	95-100	30-40	10-20
		13-31	Silt loam	CL	A-6	0	0	100	100	98-100	95-100	30-40	10-20
		31-80	Silty clay loam	CL	A-7	0	0	100	100	98-100	95-100	40-50	15-25
51B:													
Vesser----------	95	0-12	Silt loam	CL	A-6	0	0	100	100	98-100	95-100	30-40	10-20
		12-31	Silt loam	CL	A-6	0	0	100	100	98-100	95-100	30-40	10-20
		31-80	Silty clay loam	CL	A-7	0	0	100	100	98-100	95-100	40-50	15-25
54:													
Zook------------	90	0-9	Silty clay	CH, CL	A-7	0	0	100	100	95-100	95-100	45-65	20-35
		9-51	Silty clay, silty clay loam	CH	A-7	0	0	100	100	95-100	95-100	60-85	35-55
		51-80	Silty clay loam, silty clay, silt loam	CH, CL, MH, ML	A-6, A-7	0	0	100	100	95-100	95-100	35-80	10-50
54+:													
Zook------------	90	0-14	Silt loam	CL	A-6	0	0	100	100	98-100	95-100	30-40	10-20
		14-56	Silty clay, silty clay loam	CH	A-7	0	0	100	100	95-100	95-100	60-85	35-55
		56-80	Silty clay loam, silty clay, silt loam	CH, CL, MH, ML	A-6, A-7	0	0	100	100	95-100	95-100	35-80	10-50
56B:													
Cantril---------	90	0-19	Loam	CL	A-6	0	0	100	100	85-95	65-75	30-40	11-20
		19-80	Clay loam	CL	A-6, A-7	0	0	100	100	90-100	70-88	35-45	15-25
56C:													
Cantril---------	90	0-19	Loam	CL	A-6	0	0	100	100	85-95	65-75	30-40	11-20
		19-80	Clay loam	CL	A-6, A-7	0	0	100	100	90-100	70-88	35-45	15-25
65D2:													
Lindley---------	95	0-7	Loam	CL	A-6	0	0	95-100	90-100	85-95	50-65	25-35	10-15
		7-60	Clay loam, loam	CL	A-6, A-7	0	0	95-100	90-100	85-95	55-75	30-45	12-20
		60-80	Loam, clay loam	CL	A-6	0	0	95-100	90-100	85-95	50-70	25-35	10-15

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
				Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
		In				Pct	Pct					Pct	
65E:													
Lindley----------	95	0-9	Loam	CL	A-6	0	0	95-100	90-100	85-95	50-65	25-35	10-15
		9-61	Clay loam, loam	CL	A-6, A-7	0	0	95-100	90-100	85-95	55-75	30-45	12-20
		61-80	Loam, clay loam	CL	A-6	0	0	95-100	90-100	85-95	50-70	25-35	10-15
65E2:													
Lindley----------	90	0-7	Loam	CL	A-6	0	0	95-100	90-100	85-95	50-65	25-35	10-15
		7-59	Clay loam, loam	CL	A-6, A-7	0	0	95-100	90-100	85-95	55-75	30-45	12-20
		59-80	Loam, clay loam	CL	A-6	0	0	95-100	90-100	85-95	50-70	25-35	10-15
65F:													
Lindley----------	90	0-9	Loam	CL	A-6	0	0	95-100	90-100	85-95	50-65	25-35	10-15
		9-60	Clay loam, loam	CL	A-6, A-7	0	0	95-100	90-100	85-95	55-75	30-45	12-20
		60-80	Loam, clay loam	CL	A-6	0	0	95-100	90-100	85-95	50-70	25-35	10-15
65F2:													
Lindley----------	90	0-7	Loam	CL	A-6	0	0	95-100	90-100	85-95	50-65	25-35	10-15
		7-58	Clay loam, loam	CL	A-6, A-7	0	0	95-100	90-100	85-95	55-75	30-45	12-20
		58-80	Loam, clay loam	CL	A-6	0	0	95-100	90-100	85-95	50-70	25-35	10-15
65G:													
Lindley----------	95	0-9	Loam	CL	A-6	0	0	95-100	90-100	85-95	50-65	25-35	10-15
		9-59	Clay loam, loam	CL	A-6, A-7	0	0	95-100	90-100	85-95	55-75	30-45	12-20
		59-80	Loam, clay loam	CL	A-6	0	0	95-100	90-100	85-95	50-70	25-35	10-15
74:													
Rubio------------	95	0-8	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-40	5-15
		8-14	Silt loam	CL, CL-ML, ML	A-4	0	0	100	100	100	95-100	25-35	5-10
		14-30	Silty clay, silty clay loam	CH	A-7	0	0	100	100	100	95-100	55-70	30-40
		30-80	Silty clay loam	CH, CL	A-7	0	0	100	100	100	95-100	45-55	20-30
75:													
Givin------------	95	0-12	Silt loam	CL, ML	A-4, A-6	0	0	100	100	100	95-100	30-40	5-15
		12-42	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	45-60	25-35
		42-80	Silty clay loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-50	20-30
75B:													
Givin------------	95	0-12	Silt loam	CL, ML	A-4, A-6	0	0	100	100	100	95-100	30-40	5-15
		12-40	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	45-60	25-35
		40-80	Silty clay loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-50	20-30

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
		In				Pct	Pct					Pct	
76B:													
Ladoga----------	95	0-14	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-40	5-15
		14-54	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		54-80	Silty clay loam, silt loam	CL	A-6	0	0	100	100	100	95-100	30-40	15-20
76B2:													
Ladoga----------	90	0-10	Silty clay loam	CL	A-6	0	0	100	100	100	95-100	30-40	10-20
		10-50	Silty clay loam, silty clay	CL, CH	A-7	0	0	100	100	100	95-100	40-55	25-35
		50-80	Silty clay loam, silt loam	CL	A-6	0	0	100	100	100	95-100	30-40	15-20
76C:													
Ladoga----------	95	0-10	Silt loam	CL, CL-ML	A-6, A-4	0	0	100	100	100	95-100	25-40	5-15
		10-50	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		50-80	Silty clay loam, silt loam	CL	A-6	0	0	100	100	100	95-100	30-40	15-20
76C2:													
Ladoga----------	90	0-8	Silty clay loam	CL	A-6	0	0	100	100	100	95-100	30-40	10-20
		8-48	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		48-80	Silty clay loam, silt loam	CL	A-6	0	0	100	100	100	95-100	30-40	15-20
76D2:													
Ladoga----------	90	0-8	Silty clay loam	CL	A-6	0	0	100	100	100	95-100	30-40	10-20
		8-46	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		46-80	Silty clay loam, silt loam	CL	A-6	0	0	100	100	100	95-100	30-40	15-20

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
		In				Pct	Pct					Pct	
80B:													
Clinton---------	95	0-15	Silt loam	ML	A-4	0	0	100	100	100	95-100	30-40	5-10
		15-39	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		39-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
80C:													
Clinton---------	95	0-15	Silt loam	ML	A-4	0	0	100	100	100	95-100	30-40	5-10
		15-37	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		37-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
80C2:													
Clinton---------	90	0-8	Silty clay loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
		8-30	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		30-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
80D:													
Clinton---------	90	0-15	Silt loam	ML	A-4	0	0	100	100	100	95-100	30-40	5-10
		15-35	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		35-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
80D2:													
Clinton---------	90	0-8	Silty clay loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
		8-28	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		28-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
		In				Pct	Pct					Pct	
87B:													
Colo------------	68	0-16	Silty clay loam	CH, CL	A-7	0	0	100	100	90-100	90-100	40-60	15-30
		16-46	Silty clay loam	CH, CL	A-7	0	0	100	100	90-100	90-100	40-55	20-30
		46-80	Silty clay loam, clay loam, silt loam	CH, CL	A-7	0	0	100	100	95-100	80-100	40-55	15-30
Zook------------	32	0-9	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	95-100	45-65	20-35
		9-51	Silty clay, silty clay loam	CH	A-7	0	0	100	100	95-100	95-100	60-85	35-55
		51-80	Silty clay loam, silty clay, silt loam	CH, CL, MH, ML	A-6, A-7	0	0	100	100	95-100	95-100	35-80	10-50
93D2:													
Shelby----------	60	0-7	Loam	CL	A-6, A-7	0	0	90-95	85-95	75-90	55-70	35-45	15-25
		7-12	Clay loam	CL	A-6, A-7	0	0	90-95	85-95	75-90	55-70	35-45	15-25
		12-52	Clay loam	CL	A-6, A-7	0	0-5	90-95	85-95	75-90	55-70	30-45	15-25
		52-80	Clay loam	CL	A-6, A-7	0	0-5	90-95	85-95	75-90	55-70	30-45	15-25
Adair-----------	40	0-8	Clay loam	CL	A-6	0	0	95-100	80-95	75-90	60-80	30-40	10-20
		8-42	Silty clay, clay, clay loam	CH, CL	A-7	0	0	95-100	80-95	70-90	55-80	40-55	20-30
		42-80	Clay loam	CL	A-6, A-7	0	0	95-100	80-95	70-90	55-80	35-50	15-25
122:													
Sperry----------	95	0-12	Silt loam	CL	A-6	0	0	100	100	100	95-100	30-40	10-20
		12-20	Silt loam	CL	A-6	0	0	100	100	100	95-100	30-40	10-20
		20-32	Silty clay loam, silty clay	CH	A-7	0	0	100	100	100	95-100	50-65	25-35
		32-80	Silty clay loam, silt loam	CL	A-7	0	0	100	100	100	95-100	40-50	20-30
133:													
Colo------------	95	0-16	Silty clay loam	CH, CL	A-7	0	0	100	100	90-100	90-100	40-60	15-30
		16-49	Silty clay loam	CH, CL	A-7	0	0	100	100	90-100	90-100	40-55	20-30
		49-80	Silty clay loam, clay loam, silt loam	CH, CL	A-7	0	0	100	100	95-100	80-100	40-55	15-30

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
		In				Pct	Pct					Pct	
133+:													
Colo------------	90	0-14	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	95-100	25-40	5-15
		14-59	Silty clay loam	CH, CL	A-7	0	0	100	100	90-100	90-100	40-55	20-30
		59-80	Silty clay loam, clay loam, silt loam	CH, CL	A-7	0	0	100	100	95-100	80-100	40-55	15-30
133B:													
Colo------------	90	0-16	Silty clay loam	CH, CL	A-7	0	0	100	100	90-100	90-100	40-60	15-30
		16-46	Silty clay loam	CH, CL	A-7	0	0	100	100	90-100	90-100	40-55	20-30
		46-80	Silty clay loam, clay loam, silt loam	CH, CL	A-7	0	0	100	100	95-100	80-100	40-55	15-30
163E:													
Fayette---------	90	0-10	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
		10-56	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
		56-80	Silt loam	CL	A-6	0	0	100	100	100	95-100	30-40	10-20
163E2:													
Fayette---------	90	0-8	Silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	30-45	10-25
		8-54	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
		54-80	Silt loam	CL	A-6	0	0	100	100	100	95-100	30-40	10-20
163F:													
Fayette---------	90	0-10	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
		10-54	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
		54-80	Silt loam	CL	A-6	0	0	100	100	100	95-100	30-40	10-20
179D2:													
Gara------------	90	0-9	Clay loam	CL	A-6, A-7	0	0	90-95	85-95	70-85	55-75	35-45	15-25
		9-67	Clay loam, loam	CL	A-6	0	0-5	90-95	85-95	70-85	55-75	30-40	15-25
		67-80	Clay loam, loam	CL	A-6	0	0-5	90-95	85-95	70-85	55-75	30-40	15-25
179E:													
Gara------------	95	0-13	Loam	CL, CL-ML	A-4, A-6	0	0	95-100	85-95	75-85	55-70	20-30	5-15
		13-69	Clay loam, loam	CL	A-6	0	0-5	90-95	85-95	70-85	55-75	30-40	15-25
		69-80	Loam, clay loam	CL	A-6, A-7	0	0-5	90-95	85-95	70-85	55-75	35-45	15-25

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
		In				Pct	Pct					Pct	
179E2:													
Gara------------	90	0-9	Clay loam	CL	A-6, A-7	0	0	90-95	85-95	70-85	55-75	35-45	15-25
		9-65	Clay loam, loam	CL	A-6	0	0-5	90-95	85-95	70-85	55-75	30-40	15-25
		65-80	Clay loam, loam	CL	A-6	0	0-5	90-95	85-95	70-85	55-75	30-40	15-25
179F2:													
Gara------------	95	0-9	Clay loam	CL	A-6, A-7	0	0	90-95	85-95	70-85	55-75	35-45	15-25
		9-63	Clay loam, loam	CL	A-6	0	0-5	90-95	85-95	70-85	55-75	30-40	15-25
		63-80	Clay loam, loam	CL	A-6	0	0-5	90-95	85-95	70-85	55-75	30-40	15-25
180:													
Keomah----------	95	0-7	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
		7-14	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	4-15
		14-25	Silty clay, silty clay loam	CH	A-7	0	0	100	100	100	95-100	45-60	30-45
		25-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-50	15-30
220:													
Nodaway---------	90	0-9	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	95-100	90-100	25-35	5-15
		9-80	Silt loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	95-100	90-100	25-40	5-15
222C:													
Clarinda--------	90	0-11	Silty clay loam	CL	A-7	0	0	100	95-100	90-100	85-100	40-50	20-30
		11-38	Silty clay, clay	CH	A-7	0	0	100	95-100	85-100	80-100	55-70	30-40
		38-80	Clay, silty clay	CH	A-7	0	0	95-100	95-100	80-95	75-90	55-70	35-45
222C2:													
Clarinda--------	90	0-7	Silty clay loam	CL	A-7	0	0	100	95-100	90-100	85-100	40-50	20-30
		7-34	Silty clay, clay	CH	A-7	0	0	100	95-100	85-100	80-100	55-70	30-40
		34-80	Clay, silty clay	CH	A-7	0	0	95-100	95-100	80-95	75-90	55-70	35-45
223C2:													
Rinda-----------	90	0-9	Silty clay loam	CL	A-7	0	0	100	95-100	90-100	85-100	40-50	20-30
		9-20	Silty clay loam	CH	A-7	0	0	100	95-100	90-100	85-100	45-55	20-30
		20-80	Clay, silty clay	CH, CL	A-7	0	0	95-100	95-100	80-95	75-90	55-70	35-45

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
		In				Pct	Pct					Pct	
273C:													
Olmitz----------	95	0-9	Loam	CL	A-6	0	0	100	90-100	85-95	60-80	30-40	11-20
		9-32	Loam, clay loam	CL	A-6	0	0	100	90-100	85-95	60-80	30-40	11-20
		32-80	Clay loam	CL	A-6, A-7	0	0	100	90-100	85-95	60-80	35-45	15-25
279:													
Taintor---------	95	0-6	Silty clay loam	CH, CL	A-7	0	0	100	100	100	95-100	45-60	20-30
		6-17	Silty clay loam	CH, CL	A-7	0	0	100	100	100	95-100	45-60	20-30
		17-58	Silty clay, silty clay loam	CH	A-7	0	0	100	100	100	95-100	50-65	25-35
		58-80	Silty clay loam, silt loam	CL	A-7	0	0	100	100	100	95-100	40-50	15-25
280:													
Mahaska---------	95	0-18	Silty clay loam	CL	A-7, A-6	0	0	100	100	100	95-100	35-50	15-25
		18-51	Silty clay loam, silty clay	CH, MH	A-7	0	0	100	100	100	95-100	50-60	20-30
		51-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-20
280B:													
Mahaska---------	90	0-18	Silty clay loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-50	15-25
		18-51	Silty clay loam, silty clay	CH, MH	A-7	0	0	100	100	100	95-100	50-60	20-30
		51-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-20
281B:													
Otley-----------	90	0-17	Silty clay loam	CL	A-7	0	0	100	100	100	95-100	40-50	15-25
		17-40	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		40-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	20-30

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
		In				Pct	Pct					Pct	
281B2:													
Otley-----------	90	0-9	Silty clay loam	CL	A-7	0	0	100	100	100	95-100	40-50	15-25
		9-13	Silty clay loam	CL	A-7	0	0	100	100	100	95-100	40-50	15-25
		13-36	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		36-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	20-30
281C:													
Otley-----------	95	0-17	Silty clay loam	CL	A-7	0	0	100	100	100	95-100	40-50	15-25
		17-39	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		39-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	20-30
281C2:													
Otley-----------	90	0-8	Silty clay loam	CL	A-7	0	0	100	100	100	95-100	40-50	15-25
		8-11	Silty clay loam	CL	A-7	0	0	100	100	100	95-100	40-50	15-25
		11-34	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		34-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	20-30
281D2:													
Otley-----------	90	0-7	Silty clay loam	CL	A-7	0	0	100	100	100	95-100	40-50	15-25
		7-10	Silty clay loam	CL	A-7	0	0	100	100	100	95-100	40-50	15-25
		10-33	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		33-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	20-30
293C:													
Chelsea---------	57	0-6	Loamy fine sand	SM, SP-SM	A-2-4	0	0	100	100	65-95	10-35	0-14	NP
		6-80	Fine sand, sand, loamy sand	SM, SP, SP-SM	A-2-4, A-3	0	0	100	100	65-95	3-15	0-14	NP

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
		In				Pct	Pct					Pct	
293C:													
Fayette---------	38	0-10	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
		10-60	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
		60-80	Silt loam	CL	A-6	0	0	100	100	100	95-100	30-40	10-20
293D:													
Chelsea---------	57	0-6	Loamy fine sand	SM, SP-SM	A-2-4	0	0	100	100	65-95	10-35	0-14	NP
		6-80	Fine sand, sand, loamy sand	SM, SP, SP-SM	A-2-4, A-3	0	0	100	100	65-95	3-15	0-14	NP
Fayette---------	38	0-10	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
		10-58	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
		58-80	Silt loam	CL	A-6	0	0	100	100	100	95-100	30-40	10-20
293E:													
Chelsea---------	57	0-6	Loamy fine sand	SM, SP-SM	A-2-4	0	0	100	100	65-95	10-35	0-14	NP
		6-80	Fine sand, sand, loamy sand	SM, SP, SP-SM	A-2-4, A-3	0	0	100	100	65-95	3-15	0-14	NP
Fayette---------	38	0-10	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
		10-56	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
		56-80	Silt loam	CL	A-6	0	0	100	100	100	95-100	30-40	10-20
293F:													
Chelsea---------	57	0-6	Loamy fine sand	SM, SP-SM	A-2-4	0	0	100	100	65-95	10-35	0-14	NP
		6-80	Fine sand, sand, loamy sand	SM, SP, SP-SM	A-2-4, A-3	0	0	100	100	65-95	3-15	0-14	NP
Fayette---------	38	0-10	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-35	5-15
		10-54	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
		54-80	Silt loam	CL	A-6	0	0	100	100	100	95-100	30-40	10-20

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
		In				Pct	Pct					Pct	
294C:													
Billett---------	65	0-8	Fine sandy loam	SC, SC-SM, SM	A-2, A-4	0	0	100	100	85-100	25-50	0-25	2-10
		8-12	Fine sandy loam, sandy loam	SC, SC-SM, SM	A-2, A-4	0	0	100	100	95-100	25-50	20-25	2-10
		12-30	Fine sandy loam, sandy loam	SC, SC-SM	A-2, A-4, A-6	0	0-10	90-100	90-100	85-100	25-50	20-30	5-15
		30-57	Silt loam	SC-SM, SM, SP-SM	A-2, A-3	0	0	100	95-100	95-100	90-100	35-45	15-25
		57-80	Loam, silt loam	CL	A-6, A-7	0	0	100	95-100	95-100	90-100	35-45	15-25
Ladoga----------	35	0-8	Silt loam	CL, CL-ML	A-6, A-4	0	0	100	100	100	95-100	25-40	5-15
		8-41	Silty clay loam	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		41-80	Loam, sandy loam, loamy sand, sand	SC-SM, SM, SP-SM	A-2, A-3	0	0	100	100	70-90	5-20	0-14	NP
294D:													
Billett---------	65	0-8	Fine sandy loam	SC, SC-SM, SM	A-2, A-4	0	0	100	100	85-100	25-50	0-25	2-10
		8-12	Fine sandy loam, sandy loam	SC, SC-SM, SM	A-2, A-4	0	0	100	100	95-100	25-50	20-25	2-10
		12-30	Fine sandy loam, sandy loam	SC, SC-SM	A-2, A-4, A-6	0	0-10	90-100	90-100	85-100	25-50	20-30	5-15
		30-57	Silt loam	SC-SM, SM, SP-SM	A-2, A-3	0	0	100	95-100	95-100	90-100	35-45	15-25
		57-80	Loam, silt loam	CL	A-6, A-7	0	0	100	95-100	95-100	90-100	35-45	15-25
Ladoga----------	35	0-8	Silt loam	CL, CL-ML	A-6, A-4	0	0	100	100	100	95-100	25-40	5-15
		8-41	Silty clay loam	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		41-80	Loam, sandy loam, loamy sand, sand	SC-SM, SM, SP-SM	A-2, A-3	0	0	100	100	70-90	5-20	0-14	NP
313F2:													
Gosport---------	95	0-6	Silty clay loam	MH, ML	A-7	0	0	100	90-100	90-100	85-100	41-55	11-20
		6-22	Clay, silty clay, silty clay loam	CH	A-7	0	0	100	90-100	90-100	85-100	50-65	35-50
		22-80	Weathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	Percentage passing sieve number--: 10	Percentage passing sieve number--: 40	Percentage passing sieve number--: 200	Liquid limit	Plasticity index
		In				Pct	Pct					Pct	
319E:													
Dunbarton-------	95	0-7	Silt loam	CL	A-4, A-6	---	0-7	85-100	80-100	80-100	70-95	25-35	7-15
		7-16	Clay, silty clay	CH, CL	A-7	---	0-8	70-100	70-100	70-100	70-95	45-90	25-60
		16-80	Weathered bedrock, unweathered bedrock	---	---	---	---	---	---	---	---	---	---
422:													
Amana-----------	90	0-15	Silt loam	CL	A-6	0	0	100	100	95-100	90-95	25-40	10-20
		15-37	Silt loam, silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	90-95	35-45	15-25
		37-80	Silt loam	CL	A-6	0	0	100	100	95-100	75-95	30-40	10-20
423D2:													
Bucknell--------	90	0-6	Silty clay loam	CL	A-6, A-7	0	0	95-100	95-100	80-95	70-95	35-45	15-25
		6-53	Clay, clay loam	CH	A-7	0	0	95-100	95-100	90-100	85-100	50-60	25-35
		53-80	Clay loam	CL	A-6, A-7	0	0	95-100	95-100	70-90	55-85	35-50	15-30
424D:													
Lindley---------	52	0-9	Loam	CL	A-6	0	0	95-100	90-100	85-95	50-65	25-35	10-15
		9-62	Clay loam, loam	CL	A-6, A-7	0	0	95-100	90-100	85-95	55-75	30-45	12-20
		62-80	Loam, clay loam	CL	A-6	0	0	95-100	90-100	85-95	50-70	25-35	10-15
Keswick---------	43	0-9	Loam	CL, CL-ML	A-4, A-6	0	0-5	90-100	80-100	75-90	60-80	20-30	5-15
		9-29	Clay loam, clay	CL, CH	A-7	0	0-5	90-100	80-100	70-90	55-80	40-70	20-40
		29-80	Clay loam	CL	A-6	0	0-5	90-100	80-100	70-90	55-80	30-40	15-25
424D2:													
Lindley---------	52	0-7	Loam	CL	A-6	0	0	95-100	90-100	85-95	50-65	25-35	10-15
		7-60	Clay loam, loam	CL	A-6, A-7	0	0	95-100	90-100	85-95	55-75	30-45	12-20
		60-80	Loam, clay loam	CL	A-6	0	0	95-100	90-100	85-95	50-70	25-35	10-15
Keswick---------	43	0-7	Clay loam	CL	A-6, A-7	0	0-5	90-100	80-100	75-90	60-80	35-50	15-25
		7-27	Clay loam, clay	CH, CL	A-7	0	0-5	90-100	80-100	70-90	55-80	40-70	20-40
		27-80	Clay loam	CL	A-6	0	0-5	90-100	80-100	70-90	55-80	30-40	15-25
424E2:													
Lindley---------	48	0-7	Loam	CL	A-6	0	0	95-100	90-100	85-95	50-65	25-35	10-15
		7-59	Clay loam, loam	CL	A-6, A-7	0	0	95-100	90-100	85-95	55-75	30-45	12-20
		59-80	Loam, clay loam	CL	A-6	0	0	95-100	90-100	85-95	50-70	25-35	10-15

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
				Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
		In				Pct	Pct					Pct	
424E2:													
Keswick---------	42	0-7	Clay loam	CL	A-6, A-7	0	0-5	90-100	80-100	75-90	60-80	35-50	15-25
		7-25	Clay loam, clay	CH, CL	A-7	0	0-5	90-100	80-100	70-90	55-80	40-70	20-40
		25-80	Clay loam	CL	A-6	0	0-5	90-100	80-100	70-90	55-80	30-40	15-25
425D:													
Keswick---------	90	0-9	Loam	CL, CL-ML	A-4, A-6	0	0-5	90-100	80-100	75-90	60-80	20-30	5-15
		9-29	Clay loam, clay	CH, CL	A-7	0	0-5	90-100	80-100	70-90	55-80	40-70	20-40
		29-80	Clay loam	CL	A-6	0	0-5	90-100	80-100	70-90	55-80	30-40	15-25
425D2:													
Keswick---------	90	0-7	Clay loam	CL	A-6, A-7	0	0-5	90-100	80-100	75-90	60-80	35-50	15-25
		7-27	Clay loam, clay	CH, CL	A-7	0	0-5	90-100	80-100	70-90	55-80	40-70	20-40
		27-80	Clay loam	CL	A-6	0	0-5	90-100	80-100	70-90	55-80	30-40	15-25
428B:													
Ely-------------	95	0-24	Silty clay loam	CL, MH	A-6, A-7	0	0	100	100	95-100	95-100	30-55	10-25
		24-47	Silty clay loam	CL, ML	A-6, A-7	0	0	100	100	95-100	95-100	35-50	10-25
		47-80	Silt loam, silty clay loam, loam	CL	A-6	0	0	100	100	90-100	85-100	25-40	10-20
430:													
Ackmore---------	90	0-6	Silt loam	CL, ML	A-4, A-6, A-7	0	0	100	100	95-100	85-100	25-50	8-20
		6-22	Silt loam, silty clay loam	CL, ML	A-4, A-6, A-7	0	0	100	100	95-100	85-100	25-50	8-20
		22-80	Silty clay loam, silt loam	CH, CL	A-6, A-7	0	0	100	100	95-100	85-100	35-60	15-30
453:													
Tuskeego--------	95	0-9	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	95-100	25-35	5-15
		9-19	Silt loam, silty clay loam	CL	A-6	0	0	100	100	95-100	95-100	30-35	11-15
		19-61	Silty clay loam, silty clay	CH	A-7	0	0	100	100	95-100	95-100	50-60	25-35
		61-80	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	95-100	45-55	25-35

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
		In				Pct	Pct					Pct	
520:													
Coppock---------	95	0-8	Silt loam	CL	A-6	0	0	100	100	98-100	95-100	30-40	10-20
		8-25	Silt loam	CL	A-6	0	0	100	100	98-100	95-100	30-40	10-20
		25-45	Silty clay loam, silt loam	CH, CL, MH, ML	A-6, A-7	0	0	100	100	98-100	95-100	35-55	15-25
		45-80	Silty clay loam	CH, CL	A-7	0	0	100	100	98-100	95-100	40-60	15-30
520B:													
Coppock---------	95	0-8	Silt loam	CL	A-6	0	0	100	100	98-100	95-100	30-40	10-20
		8-25	Silt loam	CL	A-6	0	0	100	100	98-100	95-100	30-40	10-20
		25-45	Silty clay loam, silt loam	MH, ML, CH, CL	A-6, A-7	0	0	100	100	98-100	95-100	35-55	15-25
		45-80	Silty clay loam	CH, CL	A-7	0	0	100	100	98-100	95-100	40-60	15-30
570C:													
Nira------------	95	0-11	Silty clay loam	CH, CL, MH, ML	A-7	0	0	100	100	100	95-100	40-55	15-25
		11-40	Silty clay loam	CH, CL	A-7	0	0	100	100	100	95-100	40-55	20-30
		40-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
570C2:													
Nira------------	95	0-8	Silty clay loam	CH, CL, MH, ML	A-7	0	0	100	100	100	95-100	40-55	15-25
		8-37	Silty clay loam	CH, CL	A-7	0	0	100	100	100	95-100	40-55	20-30
		37-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
571C2:													
Hedrick---------	89	0-7	Silty clay loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
		7-48	Silty clay loam	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		48-69	Silty clay loam, silt loam	CL	A-6	0	0	100	100	100	95-100	30-40	15-20
		69-80	Clay loam, clay, silty clay	CH	A-7	0	0	95-100	95-100	90-100	85-100	50-60	25-35

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
		In				Pct	Pct					Pct	
571D2:													
Hedrick---------	95	0-7	Silty clay loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
		7-48	Silty clay loam	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		48-69	Silty clay loam, silt loam	CL	A-6	0	0	100	100	100	95-100	30-40	15-20
		69-80	Clay loam, clay, silty clay	CH	A-7	0	0	95-100	95-100	90-100	85-100	50-60	25-35
572C2:													
Inton-----------	90	0-8	Silty clay loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
		8-39	Silty clay loam	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		39-52	Silty clay loam, silt loam	CL	A-6	0	0	100	100	100	95-100	30-40	15-20
		52-80	Clay loam, clay, silty clay	CH	A-7	0	0	95-100	95-100	90-100	85-100	50-60	25-35
572D2:													
Inton-----------	90	0-7	Silty clay loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
		7-35	Silty clay loam	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		35-48	Silty clay loam, silt loam	CL	A-6	0	0	100	100	100	95-100	30-40	15-20
		48-80	Clay loam, clay, silty clay	CH	A-7	0	0	95-100	95-100	90-100	85-100	50-60	25-35
587:													
Chequest--------	90	0-14	Silty clay loam	CL	A-7	0	0	100	100	95-100	95-100	40-50	15-25
		14-80	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	95-100	90-100	45-60	20-30
587+:													
Chequest--------	90	0-14	Silt loam	CL	A-6	0	0	100	100	90-100	85-100	30-40	10-20
		14-80	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	95-100	90-100	45-60	20-30

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
		In				Pct	Pct					Pct	
687B:													
Watkins---------	90	0-15	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	85-95	25-35	5-15
		15-65	Silty clay loam, silt loam	CL, ML	A-6, A-7	0	0	100	100	95-100	85-95	35-45	10-20
		65-80	Silty clay loam, silt loam, sand	CL	A-6	0	0	100	100	95-100	85-95	30-40	10-20
688:													
Koszta----------	90	0-15	Silt loam	CL	A-6	0	0	100	100	95-100	95-100	30-40	10-20
		15-80	Silty clay loam	CL	A-7	0	0	100	100	95-100	95-100	40-50	20-30
722:													
Nodaway---------	36	0-9	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	95-100	90-100	25-35	5-15
		9-80	Silt loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	95-100	90-100	25-40	5-15
Ackmore---------	32	0-6	Silt loam	CL, ML	A-4, A-6, A-7	0	0	100	100	95-100	85-100	25-50	8-20
		6-22	Silt loam, silty clay loam	CL, ML	A-4, A-6, A-7	0	0	100	100	95-100	85-100	25-50	8-20
		22-80	Silty clay loam, silt loam	CH, CL	A-6, A-7	0	0	100	100	95-100	85-100	35-60	15-30
Vesser----------	22	0-13	Silt loam	CL	A-6	0	0	100	100	98-100	95-100	30-40	10-20
		13-31	Silt loam	CL	A-6	0	0	100	100	98-100	95-100	30-40	10-20
		31-80	Silty clay loam	CL	A-7	0	0	100	100	98-100	95-100	40-50	15-25
730B:													
Nodaway---------	46	0-9	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	95-100	90-100	25-35	5-15
		9-80	Silt loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	95-100	90-100	25-40	5-15
Coppock---------	27	0-8	Silt loam	CL	A-6	0	0	100	100	98-100	95-100	30-40	10-20
		8-25	Silt loam	CL	A-6	0	0	100	100	98-100	95-100	30-40	10-20
		25-45	Silty clay loam, silt loam	CH, CL, MH, ML	A-6, A-7	0	0	100	100	98-100	95-100	35-55	15-25
		45-80	Silty clay loam	CH, CL	A-7	0	0	100	100	98-100	95-100	40-60	15-30
Cantril---------	17	0-19	Loam	CL	A-6	0	0	100	100	85-95	65-75	30-40	11-20
		19-80	Clay loam	CL	A-6, A-7	0	0	100	100	90-100	70-88	35-45	15-25

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
		In				Pct	Pct					Pct	
779:													
Kalona----------	95	0-20	Silty clay loam	MH	A-7	0	0	100	100	100	95-100	50-65	20-30
		20-51	Silty clay loam, silty clay	CH	A-7	0	0	100	100	100	95-100	50-65	25-35
		51-80	Silty clay loam, silt loam	CL	A-7	0	0	100	100	100	95-100	40-50	15-25
792C2:													
Armstrong-------	90	0-9	Clay loam	CL	A-6, A-7	0	0-5	90-100	80-95	75-90	55-80	35-45	15-25
		9-45	Clay loam, clay, silty clay loam	CH, CL, MH, ML	A-7	0	0-5	90-100	80-95	70-90	55-80	45-70	20-35
		45-80	Clay loam	CL	A-6	0	0-5	90-100	80-95	70-90	55-80	30-40	15-20
792D2:													
Armstrong-------	95	0-9	Clay loam	CL	A-6, A-7	0	0-5	90-100	80-95	75-90	55-80	35-45	15-25
		9-43	Clay loam, clay, silty clay loam	CH, CL, MH, ML	A-7	0	0-5	90-100	80-95	70-90	55-80	45-70	20-35
		43-80	Clay loam	CL	A-6	0	0-5	90-100	80-95	70-90	55-80	30-40	15-20
795C2:													
Ashgrove--------	95	0-7	Silty clay loam	CL	A-6, A-7	0	0	100	95-100	90-100	85-100	35-45	15-25
		7-62	Clay, silty clay	CH	A-7	0	0	95-100	95-100	75-90	75-90	50-60	25-35
		62-80	Clay loam	CL	A-6	0	0	95-100	90-100	85-95	50-70	25-35	10-15
795D2:													
Ashgrove--------	82	0-7	Silty clay loam	CL	A-6, A-7	0	0	100	95-100	90-100	85-100	35-45	15-25
		7-60	Clay, silty clay	CH	A-7	0	0	95-100	95-100	75-90	75-90	50-60	25-35
		60-80	Clay loam	CL	A-6	0	0	95-100	90-100	85-95	50-70	25-35	10-15
822D2:													
Lamoni----------	90	0-6	Silty clay loam	CL	A-6, A-7	0	0	95-100	95-100	80-95	70-95	35-45	15-25
		6-61	Clay loam, clay	CH	A-7	0	0	95-100	95-100	90-100	85-100	50-60	25-35
		61-80	Clay loam	CL	A-6, A-7	0	0	95-100	95-100	70-90	55-85	35-50	15-30

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
				Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
		In				Pct	Pct					Pct	
876B:													
Ladoga----------	90	0-14	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-40	5-15
		14-54	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		54-80	Silty clay loam, silt loam	CL	A-6	0	0	100	100	100	95-100	30-40	15-20
876C2:													
Ladoga----------	90	0-8	Silty clay loam	CL	A-6	0	0	100	100	100	95-100	30-40	10-20
		8-48	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		48-80	Silty clay loam, silt loam	CL	A-6	0	0	100	100	100	95-100	30-40	15-20
876D2:													
Ladoga----------	90	0-8	Silty clay loam	CL	A-6	0	0	100	100	100	95-100	30-40	10-20
		8-46	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		46-80	Silty clay loam, silt loam	CL	A-6	0	0	100	100	100	95-100	30-40	15-20
880B:													
Clinton---------	95	0-15	Silt loam	ML	A-4	0	0	100	100	100	95-100	30-40	5-10
		15-39	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		39-60	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
		60-80	Loam, clay loam	CL	A-6, A-7	0	0	90-100	85-100	60-80	50-75	35-45	15-25
880C2:													
Clinton---------	95	0-8	Silty clay loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
		8-30	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		30-53	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
		53-80	Loam, clay loam	CL	A-6, A-7	0	0	90-100	85-100	60-80	50-75	35-45	15-25

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
		In				Pct	Pct					Pct	
880D2:													
Clinton----------	95	0-8	Silty clay loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
		8-28	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		28-51	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-25
		51-80	Loam, clay loam	CL	A-6, A-7	0	0	90-100	85-100	60-80	50-75	35-45	15-25
881B:													
Otley-----------	95	0-17	Silty clay loam	CL	A-7	0	0	100	100	100	95-100	40-50	15-25
		17-40	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	40-55	25-35
		40-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	20-30
911B:													
Colo------------	57	0-38	Silty clay loam	CH, CL	A-7	0	0	100	100	90-100	90-100	40-60	15-30
		38-44	Silty clay loam	CH, CL	A-7	0	0	100	100	90-100	90-100	40-55	20-30
		44-80	Silty clay loam, clay loam, silt loam	CH, CL	A-7	0	0	100	100	95-100	80-100	40-55	15-30
Ely-------------	38	0-24	Silty clay loam	CL, MH	A-7, A-6	0	0	100	100	95-100	95-100	30-55	10-25
		24-47	Silty clay loam	CL, ML	A-6, A-7	0	0	100	100	95-100	95-100	35-50	10-25
		47-80	Silt loam, silty clay loam, loam	CL	A-6	0	0	100	100	90-100	85-100	25-40	10-20
993D2:													
Gara------------	48	0-9	Clay loam	CL	A-6, A-7	0	0	90-95	85-95	70-85	55-75	35-45	15-25
		9-67	Clay loam, loam	CL	A-6	0	0-5	90-95	85-95	70-85	55-75	30-40	15-25
		67-80	Clay loam, loam	CL	A-6	0	0-5	90-95	85-95	70-85	55-75	30-40	15-25
Armstrong-------	42	0-9	Clay loam	CL	A-6, A-7	0	0-5	90-100	80-95	75-90	55-80	35-45	15-25
		9-43	Clay loam, clay, silty clay loam	CH, CL, MH, ML	A-7	0	0-5	90-100	80-95	70-90	55-80	45-70	20-35
		43-80	Clay loam	CL	A-6	0	0-5	90-100	80-95	70-90	55-80	30-40	15-20

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
		In				Pct	Pct					Pct	
993E2:													
Gara------------	48	0-9	Clay loam	CL	A-6, A-7	0	0	90-95	85-95	70-85	55-75	35-45	15-25
		9-65	Clay loam, loam	CL	A-6	0	0-5	90-95	85-95	70-85	55-75	30-40	15-25
		65-80	Clay loam, loam	CL	A-6	0	0-5	90-95	85-95	70-85	55-75	30-40	15-25
Armstrong-------	42	0-9	Clay loam	CL	A-6, A-7	0	0-5	90-100	80-95	75-90	55-80	35-45	15-25
		9-40	Clay loam, clay, silty clay loam	CH, CL, MH, ML	A-7	0	0-5	90-100	80-95	70-90	55-80	45-70	20-35
		40-80	Clay loam	CL	A-6	0	0-5	90-100	80-95	70-90	55-80	30-40	15-20
994D2:													
Galland---------	65	0-6	Loam	CL	A-6, A-7	0	0	90-100	80-100	75-100	65-90	30-45	10-20
		6-47	Clay loam, clay, silty clay	CH, CL	A-7	0	0-5	90-100	80-100	75-100	65-80	40-55	25-35
		47-80	Stratified sandy loam to clay	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6	0	0-5	90-100	80-100	65-95	30-60	20-35	5-15
Douds-----------	25	0-7	Loam	CL	A-6	0	0	95-100	85-100	70-90	60-80	25-35	10-20
		7-56	Clay loam, loam, sandy clay loam	CL, SC	A-6, A-7	0	0	90-100	85-100	70-80	35-60	30-45	15-25
		56-80	Stratified loamy sand to clay loam	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6	0	0	90-100	85-100	65-85	20-60	15-35	5-15
994E2:													
Galland---------	55	0-6	Loam	CL	A-6, A-7	0	0	90-100	80-100	75-100	65-90	30-45	10-20
		6-54	Clay loam, clay, silty clay	CH, CL	A-7	0	0-5	90-100	80-100	75-100	65-80	40-55	25-35
		54-80	Stratified sandy loam to clay	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6	0	0-5	90-100	80-100	65-95	30-60	20-35	5-15
Douds-----------	35	0-6	Loam	CL	A-6	0	0	95-100	85-100	70-90	60-80	25-35	10-20
		6-54	Clay loam, loam, sandy clay loam	CL, SC	A-6, A-7	0	0	90-100	85-100	70-80	35-60	30-45	15-25
		54-80	Stratified loamy sand to clay loam	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6	0	0	90-100	85-100	65-85	20-60	15-35	5-15

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
		In				Pct	Pct					Pct	
999F:													
Nordness--------	62	0-7	Silt loam, loam	CL, CL-ML	A-4	0	0	100	100	90-100	70-90	20-30	5-10
		7-11	Silty clay loam, clay loam, loam	CL	A-6, A-7	0	2-10	85-95	80-90	70-85	65-85	30-45	15-25
		11-14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Eleva-----------	23	0-4	Sandy loam	CL-ML, ML, SC-SM, SM	A-1-b, A-2-4, A-4	---	---	75-100	70-100	40-90	20-55	0-25	NP-7
		4-17	Sandy loam, fine sandy loam, loam	CL, ML, SC, SM	A-1-b, A-2-4, A-4	0	0-2	75-100	70-100	40-95	20-75	0-30	3-9
		17-24	Loamy sand, fine sand, sand	SM, SP-SM	A-1, A-2, A-3	0	0-15	75-100	70-100	35-85	5-35	0-20	NP-4
		24-80	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
999G:													
Nordness--------	62	0-7	Silt loam, loam	CL, CL-ML	A-4	0	0	100	100	90-100	70-90	20-30	5-10
		7-11	Silty clay loam, clay loam, loam	CL	A-6, A-7	0	2-10	85-95	80-90	70-85	65-85	30-45	15-25
		11-14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Eleva-----------	23	0-4	Sandy loam	CL-ML, ML, SC-SM, SM	A-1-b, A-2-4, A-4	---	---	75-100	70-100	40-90	20-55	0-25	NP-7
		4-17	Sandy loam, fine sandy loam, loam	CL, ML, SC, SM	A-1-b, A-2-4, A-4	0	0-2	75-100	70-100	40-95	20-75	0-30	3-9
		17-24	Loamy sand, fine sand, sand	SM, SP-SM	A-1, A-2, A-3	0	0-15	75-100	70-100	35-85	5-35	0-20	NP-4
		24-80	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
		In				Pct	Pct					Pct	
1075:													
Givin-----------	90	0-12	Silt loam	CL, ML	A-4, A-6	0	0	100	100	100	95-100	30-40	5-15
		12-42	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	100	95-100	45-60	25-35
		42-80	Silty clay loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-50	20-30
1220:													
Nodaway---------	90	0-9	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	95-100	90-100	25-35	5-15
		9-80	Silt loam, silty clay loam	CL, CL-ML	A-6, A-4	0	0	100	95-100	95-100	90-100	25-40	5-15
1279:													
Taintor---------	95	0-6	Silty clay loam	CH, CL	A-7	0	0	100	100	100	95-100	45-60	20-30
		6-17	Silty clay loam	CH, CL	A-7	0	0	100	100	100	95-100	45-60	20-30
		17-58	Silty clay, silty clay loam	CH	A-7	0	0	100	100	100	95-100	50-65	25-35
		58-80	Silty clay loam, silt loam	CL	A-7	0	0	100	100	100	95-100	40-50	15-25
1280:													
Mahaska---------	95	0-18	Silty clay loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-50	15-25
		18-51	Silty clay loam, silty clay	CH, MH	A-7	0	0	100	100	100	95-100	50-60	20-30
		51-80	Silty clay loam, silt loam	CL	A-6, A-7	0	0	100	100	100	95-100	35-45	15-20
1315:													
Nodaway---------	57	0-9	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	95-100	90-100	25-35	5-15
		9-80	Silt loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	95-100	90-100	25-40	5-15
Klum------------	38	0-8	Fine sandy loam, loam	CL-ML, SC-SM	A-4	0	0	100	95-100	70-90	40-55	20-35	3-10
		8-20	Stratified silt loam to sandy loam	CL-ML, SC-SM, SP-SM	A-2, A-4	0	0	100	95-100	70-95	10-70	15-30	NP-10
		20-80	Stratified loamy sand to sand	SP-SM	A-1, A-2, A-4	0	0-5	90-95	85-95	30-75	3-50	15-30	NP-10

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
		In				Pct	Pct					Pct	
5010: Pits, sand and gravel---------	100	0-80	Gravelly sand	GP, GP-GM, SP, SP-SM	---	---	0-10	---	---	---	---	---	---
5020: Pits and Dumps--	100	0-80	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
5030: Pits, limestone quarries-------	100	0-80	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
5040: Orthents, loamy-	100	0-80	Loam	---	---	---	---	---	---	---	---	---	NP-15
5048: Aquents.													
5060: Pits, clay.													
5080: Orthents, sanitary landfill.													
6051: Vesser----------	93	0-13	Silt loam	CL	A-6	0	0	100	100	98-100	95-100	30-40	10-20
		13-31	Silt loam	CL	A-6	0	0	100	100	98-100	95-100	30-40	10-20
		31-80	Silty clay loam	CL	A-7	0	0	100	100	98-100	95-100	40-50	15-25
6054: Zook------------	95	0-9	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	95-100	45-65	20-35
		9-51	Silty clay, silty clay loam	CH	A-7	0	0	100	100	95-100	95-100	60-85	35-55
		51-80	Silty clay loam, silty clay, silt loam	CH, CL, MH, ML	A-6, A-7	0	0	100	100	95-100	95-100	35-80	10-50

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
		In				Pct	Pct					Pct	
6133:													
Colo------------	90	0-16	Silty clay loam	CH, CL	A-7	0	0	100	100	90-100	90-100	40-60	15-30
		16-49	Silty clay loam	CH, CL	A-7	0	0	100	100	90-100	90-100	40-55	20-30
		49-80	Silty clay loam, clay loam, silt loam	CH, CL	A-7	0	0	100	100	95-100	80-100	40-55	15-30
6133+:													
Colo------------	90	0-14	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	95-100	25-40	5-15
		14-59	Silty clay loam	CH, CL	A-7	0	0	100	100	90-100	90-100	40-55	20-30
		59-80	Silty clay loam, clay loam, silt loam	CH, CL	A-7	0	0	100	100	95-100	80-100	40-55	15-30
6220:													
Nodaway---------	90	0-9	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	95-100	90-100	25-35	5-15
		9-80	Silt loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	95-100	90-100	25-40	5-15
6315:													
Nodaway---------	57	0-9	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	95-100	90-100	25-35	5-15
		9-80	Silt loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	95-100	90-100	25-40	5-15
Klum------------	38	0-8	Fine sandy loam, loam	CL-ML, SC-SM	A-4	0	0	100	95-100	70-90	40-55	20-35	3-10
		8-20	Stratified silt loam to sandy loam	CL-ML, SC-SM, SP-SM	A-2, A-4	0	0	100	95-100	70-95	10-70	15-30	NP-10
		20-80	Stratified loamy sand to sand	SP-SM	A-1, A-2, A-4	0	0-5	90-95	85-95	30-75	3-50	15-30	NP-10
6422:													
Amana-----------	89	0-15	Silt loam	CL	A-6	0	0	100	100	95-100	90-95	25-40	10-20
		15-37	Silt loam, silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	90-95	35-45	15-25
		37-80	Silt loam	CL	A-6	0	0	100	100	95-100	75-95	30-40	10-20

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Percent of map unit	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	Percentage passing sieve number--: 10	Percentage passing sieve number--: 40	Percentage passing sieve number--: 200	Liquid limit	Plasticity index
		In				Pct	Pct					Pct	
6587:													
Chequest--------	90	0-14	Silty clay loam	CL	A-7	0	0	100	100	95-100	95-100	40-50	15-25
		14-80	Silty clay loam, silty clay	CH, CL	A-7	0	0	100	100	95-100	90-100	45-60	20-30
AW:													
Animal waste.													
SL:													
Sewage lagoon.													
W:													
Water.													

Table 19.--Physical Properties of the Soils

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer. Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Percent of map unit	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi-bility group	Wind erodi-bility index
		In	Pct	g/cc	In/hr	In/in	Pct	Pct					
8B:													
Judson----------------	95	0-28	27-32	1.30-1.35	0.60-2.00	0.21-0.23	3.0-5.9	3.0-4.0	.28	.28	5	7	38
		28-58	30-35	1.35-1.45	0.60-2.00	0.21-0.23	3.0-5.9	2.0-3.0	.43	.43			
		58-80	25-32	1.35-1.45	0.60-2.00	0.21-0.23	3.0-5.9	0.0-1.0	.43	.43			
8C:													
Judson----------------	95	0-25	27-32	1.30-1.35	0.60-2.00	0.21-0.23	3.0-5.9	3.0-4.0	.28	.28	5	7	38
		25-58	30-35	1.35-1.45	0.60-2.00	0.21-0.23	3.0-5.9	2.0-3.0	.43	.43			
		58-80	25-32	1.35-1.45	0.60-2.00	0.21-0.23	3.0-5.9	0.0-1.0	.43	.43			
13B:													
Olmitz----------------	30	0-9	24-27	1.40-1.45	0.60-2.00	0.19-0.21	3.0-5.9	3.0-4.0	.24	.24	5	6	48
		9-32	24-30	1.40-1.45	0.60-2.00	0.19-0.21	3.0-5.9	2.0-3.0	.28	.28			
		32-80	27-34	1.45-1.55	0.60-2.00	0.15-0.17	3.0-5.9	1.0-2.0	.28	.28			
Vesser----------------	28	0-12	20-26	1.30-1.35	0.60-2.00	0.20-0.24	3.0-5.9	2.5-3.5	.28	.28	5	6	48
		12-31	18-22	1.35-1.40	0.60-2.00	0.18-0.22	3.0-5.9	1.0-2.0	.43	.43			
		31-80	30-35	1.40-1.45	0.60-2.00	0.17-0.21	3.0-5.9	0.0-1.0	.43	.43			
Zook------------------	27	0-9	35-40	1.30-1.35	0.20-0.60	0.21-0.23	6.0-8.9	5.0-7.0	.37	.37	5	7	38
		9-51	36-45	1.30-1.45	0.06-0.20	0.11-0.13	6.0-8.9	3.0-4.0	.28	.28			
		51-80	20-45	1.30-1.45	0.06-0.60	0.11-0.22	6.0-8.9	0.0-1.0	.28	.28			
24D2:													
Shelby----------------	95	0-7	27-35	1.50-1.55	0.20-0.60	0.16-0.18	3.0-5.9	2.2-3.2	.32	.32	5	6	48
		7-12	30-35	1.50-1.55	0.20-0.60	0.16-0.18	3.0-5.9	1.0-2.0	.28	.28			
		12-52	30-35	1.55-1.65	0.20-0.60	0.16-0.18	3.0-5.9	0.0-1.0	.28	.28			
		52-80	30-35	1.55-1.65	0.20-0.60	0.16-0.18	3.0-5.9	0.0-0.5	.37	.37			
24E2:													
Shelby----------------	90	0-7	27-35	1.50-1.55	0.20-0.60	0.16-0.18	3.0-5.9	2.2-3.2	.32	.32	5	6	48
		7-12	30-35	1.50-1.55	0.20-0.60	0.16-0.18	3.0-5.9	1.0-2.0	.28	.28			
		12-50	30-35	1.55-1.65	0.20-0.60	0.16-0.18	3.0-5.9	0.0-1.0	.28	.28			
		50-80	30-35	1.55-1.65	0.20-0.60	0.16-0.18	3.0-5.9	0.0-0.5	.37	.37			
51:													
Vesser----------------	90	0-13	20-26	1.30-1.35	0.60-2.00	0.20-0.24	3.0-5.9	3.0-4.0	.28	.28	5	6	48
		13-31	18-22	1.35-1.40	0.60-2.00	0.18-0.22	3.0-5.9	1.0-2.0	.43	.43			
		31-80	30-35	1.40-1.45	0.60-2.00	0.17-0.21	3.0-5.9	0.0-1.0	.43	.43			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
		In	Pct	g/cc	In/hr	In/in	Pct	Pct					
51B:													
Vesser----------------	95	0-12	20-26	1.30-1.35	0.60-2.00	0.20-0.24	3.0-5.9	2.5-3.5	.28	.28	5	6	48
		12-31	18-22	1.35-1.40	0.60-2.00	0.18-0.22	3.0-5.9	1.0-2.0	.43	.43			
		31-80	30-35	1.40-1.45	0.60-2.00	0.17-0.21	3.0-5.9	0.0-1.0	.43	.43			
54:													
Zook------------------	90	0-9	35-40	1.30-1.35	0.20-0.60	0.21-0.23	6.0-8.9	5.0-7.0	.37	.37	5	7	38
		9-51	36-45	1.30-1.45	0.06-0.20	0.11-0.13	6.0-8.9	2.0-4.0	.28	.28			
		51-80	20-45	1.30-1.45	0.06-0.60	0.11-0.22	6.0-8.9	0.0-1.0	.28	.28			
54+:													
Zook------------------	90	0-14	20-26	1.30-1.35	0.60-2.00	0.20-0.24	3.0-5.9	3.0-4.0	.28	.28	5	6	48
		14-56	36-45	1.30-1.45	0.06-0.20	0.11-0.13	6.0-8.9	2.0-4.0	.28	.28			
		56-80	20-45	1.30-1.45	0.06-0.60	0.11-0.22	6.0-8.9	0.0-1.0	.28	.28			
56B:													
Cantril---------------	90	0-19	14-27	1.40-1.45	0.60-2.00	0.17-0.19	0.0-2.9	2.5-3.5	.28	.28	5	6	48
		19-80	27-35	1.45-1.75	0.60-2.00	0.14-0.16	3.0-5.9	0.0-1.0	.32	.32			
56C:													
Cantril---------------	90	0-19	14-27	1.40-1.45	0.60-2.00	0.17-0.19	0.0-2.9	2.5-3.5	.28	.28	5	6	48
		19-80	27-35	1.45-1.75	0.60-2.00	0.14-0.16	3.0-5.9	0.0-1.0	.32	.32			
65D2:													
Lindley---------------	95	0-7	18-27	1.20-1.40	0.60-2.00	0.16-0.18	0.0-2.9	1.5-2.5	.32	.32	5	6	48
		7-60	25-35	1.40-1.60	0.20-0.60	0.14-0.18	3.0-5.9	0.1-1.0	.32	.32			
		60-80	18-32	1.45-1.65	0.20-0.60	0.12-0.16	3.0-5.9	0.1-0.5	.32	.32			
65E:													
Lindley---------------	95	0-9	18-27	1.20-1.40	0.60-2.00	0.16-0.18	0.0-2.9	2.0-3.0	.32	.32	5	6	48
		9-61	25-35	1.40-1.60	0.20-0.60	0.14-0.18	3.0-5.9	0.1-1.0	.32	.32			
		61-80	18-32	1.45-1.65	0.20-0.60	0.12-0.16	3.0-5.9	0.1-0.5	.32	.32			
65E2:													
Lindley---------------	90	0-7	18-27	1.20-1.40	0.60-2.00	0.16-0.18	0.0-2.9	1.5-2.5	.32	.32	5	6	48
		7-59	25-35	1.40-1.60	0.20-0.60	0.14-0.18	3.0-5.9	0.1-1.0	.32	.32			
		59-80	18-32	1.45-1.65	0.20-0.60	0.12-0.16	3.0-5.9	0.1-0.5	.32	.32			
65F:													
Lindley---------------	90	0-9	18-27	1.20-1.40	0.60-2.00	0.16-0.18	0.0-2.9	2.0-3.0	.32	.32	5	6	48
		9-60	25-35	1.40-1.60	0.20-0.60	0.14-0.18	3.0-5.9	0.1-1.0	.32	.32			
		60-80	18-32	1.45-1.65	0.20-0.60	0.12-0.16	3.0-5.9	0.1-0.5	.32	.32			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
		In	Pct	g/cc	In/hr	In/in	Pct	Pct					
65F2:													
Lindley---------------	90	0-7	18-27	1.20-1.40	0.60-2.00	0.16-0.18	0.0-2.9	1.5-2.5	.32	.32	5	6	48
		7-58	25-35	1.40-1.60	0.20-0.60	0.14-0.18	3.0-5.9	0.1-1.0	.32	.32			
		58-80	18-32	1.45-1.65	0.20-0.60	0.12-0.16	3.0-5.9	0.1-0.5	.32	.32			
65G:													
Lindley---------------	95	0-9	18-27	1.20-1.40	0.60-2.00	0.16-0.18	0.0-2.9	2.0-3.0	.32	.32	5	6	48
		9-59	25-35	1.40-1.60	0.20-0.60	0.14-0.18	3.0-5.9	0.1-1.0	.32	.32			
		59-80	18-32	1.45-1.65	0.20-0.60	0.12-0.16	3.0-5.9	0.1-0.5	.32	.32			
74:													
Rubio-----------------	95	0-8	16-22	1.35-1.40	0.60-2.00	0.22-0.24	0.0-2.9	2.5-3.5	.37	.37	3	6	48
		8-14	16-22	1.40-1.45	0.60-2.00	0.20-0.22	0.0-2.9	0.0-0.5	.43	.43			
		14-30	35-42	1.45-1.50	0.06-0.20	0.12-0.18	6.0-8.9	0.0-0.5	.43	.43			
		30-80	32-40	1.50-1.55	0.20-0.60	0.18-0.20	6.0-8.9	0.0-0.5	.43	.43			
75:													
Givin-----------------	95	0-12	18-26	1.30-1.40	0.60-2.00	0.22-0.24	3.0-5.9	3.0-4.0	.32	.32	5	6	48
		12-42	36-42	1.30-1.45	0.20-0.60	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43			
		42-80	27-34	1.40-1.50	0.20-0.60	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
75B:													
Givin-----------------	95	0-12	18-26	1.30-1.40	0.60-2.00	0.22-0.24	3.0-5.9	2.5-3.5	.32	.32	5	6	48
		12-40	36-42	1.30-1.45	0.20-0.60	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43			
		40-80	27-34	1.40-1.50	0.20-0.60	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
76B:													
Ladoga----------------	95	0-14	18-27	1.30-1.35	0.60-2.00	0.22-0.24	0.0-2.9	2.5-3.5	.32	.32	5	6	48
		14-54	36-42	1.30-1.40	0.20-0.60	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43			
		54-80	24-32	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
76B2:													
Ladoga----------------	90	0-10	27-35	1.30-1.35	0.60-2.00	0.20-0.22	0.0-2.9	2.0-3.0	.32	.32	5	7	38
		10-50	36-42	1.30-1.40	0.20-0.60	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43			
		50-80	24-32	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
76C:													
Ladoga----------------	95	0-10	18-27	1.30-1.35	0.60-2.00	0.22-0.24	0.0-2.9	2.5-3.5	.32	.32	5	6	48
		10-50	36-42	1.30-1.40	0.20-0.60	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43			
		50-80	24-32	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
76C2:													
Ladoga----------------	90	0-8	27-35	1.30-1.35	0.60-2.00	0.20-0.22	0.0-2.9	2.0-3.0	.32	.32	5	7	38
		8-48	36-42	1.30-1.40	0.20-0.60	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43			
		48-80	24-32	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi- bility group	Wind erodi- bility index
		In	Pct	g/cc	In/hr	In/in	Pct	Pct					
76D2:													
Ladoga----------------	90	0-8	27-35	1.30-1.35	0.60-2.00	0.20-0.22	0.0-2.9	2.0-3.0	.32	.32	5	7	38
		8-46	36-42	1.30-1.40	0.20-0.60	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43			
		46-80	24-32	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
80B:													
Clinton---------------	95	0-15	16-26	1.30-1.40	0.60-2.00	0.20-0.22	0.0-2.9	2.0-3.0	.37	.37	5	6	48
		15-39	36-42	1.35-1.45	0.20-0.60	0.16-0.20	3.0-5.9	0.0-1.0	.37	.37			
		39-80	24-35	1.40-1.55	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.37	.37			
80C:													
Clinton---------------	95	0-15	16-26	1.30-1.40	0.60-2.00	0.20-0.22	0.0-2.9	2.0-3.0	.37	.37	5	6	48
		15-37	36-42	1.35-1.45	0.20-0.60	0.16-0.20	3.0-5.9	0.0-1.0	.37	.37			
		37-80	24-35	1.40-1.55	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.37	.37			
80C2:													
Clinton---------------	90	0-8	27-34	1.30-1.40	0.60-2.00	0.18-0.20	0.0-2.9	1.5-2.5	.37	.37	5	7	38
		8-30	36-42	1.35-1.45	0.20-0.60	0.16-0.20	3.0-5.9	0.0-0.5	.37	.37			
		30-80	24-35	1.40-1.55	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.37	.37			
80D:													
Clinton---------------	90	0-15	16-26	1.30-1.40	0.60-2.00	0.18-0.20	0.0-2.9	2.0-3.0	.37	.37	5	6	48
		15-35	36-42	1.35-1.45	0.20-0.60	0.16-0.20	3.0-5.9	0.0-1.0	.37	.37			
		35-80	24-35	1.40-1.55	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.37	.37			
80D2:													
Clinton---------------	90	0-8	27-34	1.30-1.40	0.60-2.00	0.20-0.22	0.0-2.9	1.5-2.5	.37	.37	5	7	38
		8-28	36-42	1.35-1.45	0.20-0.60	0.16-0.20	3.0-5.9	0.0-0.5	.37	.37			
		28-80	24-35	1.40-1.55	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.37	.37			
87B:													
Colo------------------	68	0-16	27-36	1.28-1.32	0.60-2.00	0.21-0.23	3.0-5.9	5.0-7.0	.28	.28	5	7	38
		16-46	30-35	1.25-1.35	0.60-2.00	0.18-0.20	3.0-5.9	3.0-4.0	.28	.28			
		46-80	25-35	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	1.0-2.0	.32	.32			
Zook------------------	32	0-9	35-40	1.30-1.35	0.20-0.60	0.21-0.23	6.0-8.9	5.0-7.0	.37	.37	5	7	38
		9-51	36-45	1.30-1.45	0.06-0.20	0.11-0.13	6.0-8.9	3.0-4.0	.28	.28			
		51-80	20-45	1.30-1.45	0.06-0.60	0.11-0.22	6.0-8.9	0.0-1.0	.28	.28			
93D2:													
Shelby----------------	60	0-7	27-35	1.50-1.55	0.20-0.60	0.16-0.18	3.0-5.9	2.0-3.0	.32	.32	5	6	48
		7-12	30-35	1.50-1.55	0.20-0.60	0.16-0.18	3.0-5.9	1.0-2.0	.28	.28			
		12-52	30-35	1.55-1.65	0.20-0.60	0.16-0.18	3.0-5.9	0.0-1.0	.28	.28			
		52-80	30-35	1.55-1.65	0.20-0.60	0.16-0.18	3.0-5.9	0.0-0.5	.37	.37			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi-bility group	Wind erodi-bility index
		In	Pct	g/cc	In/hr	In/in	Pct	Pct					
93D2:													
Adair	40	0-8	35-42	1.45-1.50	0.20-0.60	0.17-0.19	3.0-5.9	2.0-3.0	.32	.32	3	4	86
		8-42	38-60	1.55-1.60	0.06-0.20	0.13-0.16	6.0-8.9	0.5-1.0	.32	.32			
		42-80	30-38	1.60-1.70	0.20-0.60	0.14-0.16	3.0-5.9	0.0-0.5	.32	.32			
122:													
Sperry	95	0-12	18-22	1.35-1.40	0.60-2.00	0.22-0.24	3.0-5.9	3.0-4.0	.37	.37	3	6	48
		12-20	18-22	1.35-1.40	0.60-2.00	0.22-0.24	3.0-5.9	0.5-1.0	.43	.43			
		20-32	38-45	1.40-1.45	0.06-0.20	0.14-0.16	6.0-8.9	0.5-2.0	.43	.43			
		32-80	26-34	1.45-1.50	0.20-0.60	0.19-0.21	6.0-8.9	0.0-1.0	.43	.43			
133:													
Colo	95	0-16	27-36	1.28-1.32	0.60-2.00	0.21-0.23	3.0-5.9	5.0-7.0	.28	.28	5	7	38
		16-49	30-35	1.25-1.35	0.60-2.00	0.18-0.20	3.0-5.9	3.0-4.0	.28	.28			
		49-80	25-35	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	1.0-2.0	.32	.32			
133+:													
Colo	90	0-14	20-26	1.25-1.30	0.60-2.00	0.22-0.24	3.0-5.9	3.0-5.0	.28	.28	5	6	48
		14-59	30-35	1.25-1.35	0.60-2.00	0.18-0.20	3.0-5.9	3.0-4.0	.28	.28			
		59-80	25-35	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	1.0-2.0	.32	.32			
133B:													
Colo	90	0-16	27-36	1.28-1.32	0.60-2.00	0.21-0.23	3.0-5.9	5.0-7.0	.28	.28	5	7	38
		16-46	30-35	1.25-1.35	0.60-2.00	0.18-0.20	3.0-5.9	3.0-4.0	.28	.28			
		46-80	25-35	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	1.0-2.0	.32	.32			
163E:													
Fayette	90	0-10	15-27	1.30-1.35	0.60-2.00	0.20-0.22	0.0-2.9	2.0-3.0	.32	.32	5	6	48
		10-56	25-35	1.30-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-1.0	.43	.43			
		56-80	22-26	1.45-1.50	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
163E2:													
Fayette	90	0-8	25-27	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	1.5-2.5	.37	.37	5	6	48
		8-54	25-35	1.30-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
		54-80	22-26	1.45-1.50	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
163F:													
Fayette	90	0-10	15-27	1.30-1.35	0.60-2.00	0.20-0.22	0.0-2.9	2.0-3.0	.32	.32	5	6	48
		10-54	25-35	1.30-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-1.0	.43	.43			
		54-80	22-26	1.45-1.50	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
179D2:													
Gara	90	0-9	27-35	1.50-1.55	0.20-0.60	0.16-0.18	3.0-5.9	2.0-3.0	.32	.32	5	6	48
		9-67	25-38	1.55-1.75	0.20-0.60	0.16-0.18	3.0-5.9	0.0-0.5	.32	.32			
		67-80	24-38	1.65-1.75	0.20-0.60	0.16-0.18	3.0-5.9	0.0-0.5	.37	---			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
		In	Pct	g/cc	In/hr	In/in	Pct	Pct					
179E:													
Gara------------------	95	0-13	18-27	1.50-1.55	0.60-2.00	0.20-0.22	3.0-5.9	2.0-3.0	.28	.28	5	6	48
		13-69	25-38	1.55-1.75	0.20-0.60	0.16-0.18	3.0-5.9	0.0-1.0	.32	.32			
		69-80	24-38	1.65-1.75	0.20-0.60	0.16-0.18	3.0-5.9	0.0-0.5	.37	.37			
179E2:													
Gara------------------	90	0-9	27-35	1.50-1.55	0.20-0.60	0.16-0.18	3.0-5.9	2.0-3.0	.32	.32	5	6	48
		9-65	25-38	1.55-1.75	0.20-0.60	0.16-0.18	3.0-5.9	0.0-0.5	.32	.32			
		65-80	24-38	1.65-1.75	0.20-0.60	0.16-0.18	3.0-5.9	0.0-0.5	.37	---			
179F2:													
Gara------------------	95	0-9	27-35	1.50-1.55	0.20-0.60	0.16-0.18	3.0-5.9	2.0-3.0	.32	.32	5	6	48
		9-63	25-38	1.55-1.75	0.20-0.60	0.16-0.18	3.0-5.9	0.0-0.5	.32	.32			
		63-80	24-38	1.65-1.75	0.20-0.60	0.16-0.18	3.0-5.9	0.0-0.5	.37	---			
180:													
Keomah----------------	95	0-7	16-26	1.30-1.40	0.60-2.00	0.22-0.24	0.0-2.9	2.5-3.5	.37	.37	3	6	48
		7-14	16-26	1.35-1.45	0.20-0.60	0.18-0.20	0.0-2.9	0.2-1.0	.37	.37			
		14-25	35-42	1.30-1.45	0.06-0.60	0.18-0.20	6.0-8.9	0.0-0.5	.37	.37			
		25-80	24-38	1.40-1.55	0.20-0.60	0.18-0.20	3.0-5.9	0.0-0.5	.37	.37			
220:													
Nodaway---------------	90	0-9	18-27	1.25-1.35	0.60-2.00	0.20-0.23	0.0-2.9	1.5-2.5	.32	.32	5	6	48
		9-80	18-28	1.25-1.35	0.60-2.00	0.20-0.23	3.0-5.9	0.0-0.5	.43	.43			
222C:													
Clarinda--------------	90	0-11	27-38	1.45-1.50	0.20-0.60	0.17-0.19	3.0-5.9	3.0-4.0	.37	.37	3	7	38
		11-38	40-60	1.50-1.65	0.0000-0.06	0.14-0.16	6.0-8.9	0.5-1.0	.37	.37			
		38-80	40-60	1.50-1.65	0.0000-0.06	0.14-0.16	6.0-8.9	0.0-0.5	.37	.37			
222C2:													
Clarinda--------------	90	0-7	27-38	1.45-1.50	0.20-0.60	0.17-0.19	3.0-5.9	2.2-3.2	.37	.37	3	7	38
		7-34	40-60	1.50-1.65	0.0000-0.60	0.14-0.16	6.0-8.9	0.5-1.0	.37	.37			
		34-80	40-60	1.50-1.65	0.0000-0.06	0.14-0.16	6.0-8.9	0.0-0.5	.37	.37			
223C2:													
Rinda-----------------	90	0-9	27-35	1.45-1.50	0.20-0.60	0.20-0.22	3.0-5.9	2.0-3.0	.43	.43	3	7	38
		9-20	30-40	1.45-1.50	0.20-0.60	0.18-0.20	6.0-8.9	0.0-0.5	.43	.43			
		20-80	40-60	1.50-1.65	0.0000-0.06	0.14-0.16	6.0-8.9	0.0-0.5	.32	.32			
273C:													
Olmitz----------------	95	0-9	24-27	1.40-1.45	0.60-2.00	0.19-0.21	3.0-5.9	3.0-4.0	.24	.24	5	6	48
		9-32	24-30	1.40-1.45	0.60-2.00	0.19-0.21	3.0-5.9	2.0-3.0	.28	.28			
		32-80	27-34	1.45-1.55	0.60-2.00	0.15-0.17	3.0-5.9	1.0-2.0	.28	.28			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi- bility group	Wind erodi- bility index
		In	Pct	g/cc	In/hr	In/in	Pct	Pct					
279:													
Taintor---------------	95	0-6	27-36	1.30-1.40	0.20-0.60	0.21-0.23	3.0-5.9	5.0-6.0	.28	.28	5	7	38
		6-17	30-36	1.30-1.40	0.20-0.60	0.21-0.23	3.0-5.9	2.0-3.0	.32	.32			
		17-58	35-44	1.30-1.45	0.20-0.60	0.14-0.18	6.0-8.9	0.0-1.0	.43	.43			
		58-80	24-34	1.40-1.50	0.60-2.00	0.18-0.20	3.0-5.9	0.0-1.0	.43	.43			
280:													
Mahaska---------------	95	0-18	27-32	1.30-1.40	0.60-2.00	0.21-0.23	3.0-5.9	5.0-6.0	.28	.28	5	7	38
		18-51	36-42	1.30-1.45	0.60-2.00	0.14-0.18	3.0-5.9	1.0-2.0	.43	.43			
		51-80	24-32	1.40-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-1.0	.43	.43			
280B:													
Mahaska---------------	90	0-18	27-32	1.30-1.40	0.60-2.00	0.21-0.23	3.0-5.9	4.5-5.5	.28	.28	5	7	38
		18-51	36-42	1.30-1.45	0.60-2.00	0.14-0.18	3.0-5.9	1.0-2.0	.43	.43			
		51-80	24-32	1.40-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-1.0	.43	.43			
281B:													
Otley-----------------	90	0-17	28-34	1.25-1.35	0.60-2.00	0.21-0.23	3.0-5.9	3.0-4.0	.28	.28	5	7	38
		17-40	36-42	1.30-1.40	0.60-2.00	0.18-0.20	3.0-5.9	1.0-2.0	.43	.43			
		40-80	24-35	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
281B2:													
Otley-----------------	90	0-9	28-34	1.25-1.35	0.60-2.00	0.21-0.23	3.0-5.9	2.2-3.2	.32	.32	5	7	38
		9-13	28-34	1.25-1.35	0.60-2.00	0.21-0.23	3.0-5.9	1.0-2.0	.43	.43			
		13-36	36-42	1.30-1.40	0.60-2.00	0.18-0.20	3.0-5.9	0.0-1.0	.43	.43			
		36-80	24-35	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
281C:													
Otley-----------------	95	0-17	28-34	1.25-1.35	0.60-2.00	0.21-0.23	3.0-5.9	3.0-4.0	.28	.28	5	7	38
		17-39	36-42	1.30-1.40	0.60-2.00	0.18-0.20	3.0-5.9	1.0-2.0	.43	.43			
		39-80	24-35	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
281C2:													
Otley-----------------	90	0-8	28-34	1.25-1.35	0.60-2.00	0.21-0.23	3.0-5.9	2.2-3.2	.32	.32	5	7	38
		8-11	28-34	1.25-1.35	0.60-2.00	0.21-0.23	3.0-5.9	1.0-2.0	.43	.43			
		11-34	36-42	1.30-1.40	0.60-2.00	0.18-0.20	3.0-5.9	0.0-1.0	.43	.43			
		34-80	24-35	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
281D2:													
Otley-----------------	90	0-7	28-34	1.25-1.35	0.60-2.00	0.21-0.23	3.0-5.9	2.2-3.2	.32	.32	5	7	38
		7-10	28-34	1.25-1.35	0.60-2.00	0.21-0.23	3.0-5.9	1.0-2.0	.43	.43			
		10-33	36-42	1.30-1.40	0.60-2.00	0.18-0.20	3.0-5.9	0.0-1.0	.43	.43			
		33-80	24-35	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi- bility group	Wind erodi- bility index
		In	Pct	g/cc	In/hr	In/in	Pct	Pct					
293C:													
Chelsea---------------	57	0-6	8-15	1.50-1.55	6.00-20	0.10-0.15	0.0-2.9	0.4-1.5	.17	.17	5	2	134
		6-80	5-10	1.55-1.70	6.00-20	0.06-0.08	0.0-2.9	0.0-0.5	.17	.17			
Fayette---------------	38	0-10	15-27	1.30-1.35	0.60-2.00	0.20-0.22	0.0-2.9	2.0-3.0	.32	.32	5	6	48
		10-60	25-35	1.30-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-1.0	.43	.43			
		60-80	22-26	1.45-1.50	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
293D:													
Chelsea---------------	57	0-6	8-15	1.50-1.55	6.00-20	0.10-0.15	0.0-2.9	0.4-1.5	.17	.17	5	2	134
		6-80	5-10	1.55-1.70	6.00-20	0.06-0.08	0.0-2.9	0.0-0.5	.17	.17			
Fayette---------------	38	0-10	15-27	1.30-1.35	0.60-2.00	0.20-0.22	0.0-2.9	2.0-3.0	.32	.32	5	6	48
		10-58	25-35	1.30-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-1.0	.43	.43			
		58-80	22-26	1.45-1.50	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
293E:													
Chelsea---------------	57	0-6	8-15	1.50-1.55	6.00-20	0.10-0.15	0.0-2.9	0.4-1.5	.17	.17	5	2	134
		6-80	5-10	1.55-1.70	6.00-20	0.06-0.08	0.0-2.9	0.0-0.5	.17	.17			
Fayette---------------	38	0-10	15-27	1.30-1.35	0.60-2.00	0.20-0.22	0.0-2.9	2.0-3.0	.32	.32	5	6	48
		10-56	25-35	1.30-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-1.0	.43	.43			
		56-80	22-26	1.45-1.50	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
293F:													
Chelsea---------------	57	0-6	8-15	1.50-1.55	6.00-20	0.10-0.15	0.0-2.9	0.4-1.5	.17	.17	5	2	134
		6-80	5-10	1.55-1.70	6.00-20	0.06-0.08	0.0-2.9	0.0-0.5	.17	.17			
Fayette---------------	38	0-10	15-27	1.30-1.35	0.60-2.00	0.20-0.22	0.0-2.9	2.0-3.0	.32	.32	5	6	48
		10-54	25-35	1.30-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-1.0	.43	.43			
		54-80	22-26	1.45-1.50	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
294C:													
Billett---------------	65	0-8	7-15	1.45-1.65	2.00-6.00	0.14-0.16	0.0-2.9	1.0-2.0	.20	.20	4	3	86
		8-12	7-15	1.50-1.70	2.00-6.00	0.13-0.15	0.0-2.9	0.5-1.0	.20	.20			
		12-30	10-18	1.45-1.55	2.00-6.00	0.12-0.15	0.0-2.9	0.5-1.0	.24	.24			
		30-57	18-27	1.40-1.45	0.60-2.00	0.20-0.23	3.0-5.9	0.0-0.5	.37	.37			
		57-80	18-27	1.40-1.45	0.60-2.00	0.20-0.23	3.0-5.9	0.0-0.5	.37	.37			
Ladoga----------------	35	0-8	18-27	1.30-1.35	0.60-2.00	0.22-0.24	0.0-2.9	2.5-3.5	.32	.32	5	6	48
		8-41	36-42	1.30-1.40	0.20-0.60	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43			
		41-80	4-12	0.08-1.70	2.00-20	0.04-0.06	0.0-2.9	0.0-0.5	.17	.17			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi- bility group	Wind erodi- bility index
		In	Pct	g/cc	In/hr	In/in	Pct	Pct					
294D:													
Billett----------------	65	0-8	7-15	1.45-1.65	2.00-6.00	0.14-0.16	0.0-2.9	1.0-2.0	.20	.20	4	3	86
		8-12	7-15	1.50-1.70	2.00-6.00	0.13-0.15	0.0-2.9	0.5-1.0	.20	.20			
		12-30	10-18	1.45-1.55	2.00-6.00	0.12-0.15	0.0-2.9	0.5-1.0	.24	.24			
		30-57	18-27	1.40-1.45	0.60-2.00	0.20-0.23	3.0-5.9	0.0-0.5	.37	.37			
		57-80	18-27	1.40-1.45	0.60-2.00	0.20-0.23	3.0-5.9	0.0-0.5	.37	.37			
Ladoga-----------------	35	0-8	18-27	1.30-1.35	0.60-2.00	0.22-0.24	0.0-2.9	2.5-3.5	.32	.32	5	6	48
		8-41	36-42	1.30-1.40	0.20-0.60	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43			
		41-80	4-12	0.08-1.70	2.00-20	0.04-0.06	0.0-2.9	0.0-0.5	.17	.17			
313F2:													
Gosport----------------	95	0-6	27-34	1.30-1.40	0.20-0.60	0.14-0.16	3.0-5.9	1.5-2.5	.43	.43	3	7	38
		6-22	36-60	1.50-1.60	0.0000-0.06	0.12-0.14	6.0-8.9	0.0-0.5	.32	.32			
		22-80	---	---	0.0000-0.06	---	---	---	---	---			
319E:													
Dunbarton--------------	95	0-7	15-27	1.10-1.60	0.60-2.00	0.22-0.24	0.0-2.9	1.0-3.0	.37	.37	1	6	48
		7-16	40-80	1.25-1.55	0.06-0.20	0.09-0.13	6.0-8.9	---	.28	.28			
		16-80	---	---	0.06-2.00	---	---	---	---	---			
422:													
Amana------------------	90	0-15	18-27	1.20-1.30	0.60-2.00	0.22-0.24	3.0-5.9	3.5-4.5	.28	.28	5	6	48
		15-37	18-30	1.25-1.40	0.60-2.00	0.20-0.22	3.0-5.9	1.0-2.0	.37	.37			
		37-80	18-26	1.25-1.40	0.60-2.00	0.20-0.22	3.0-5.9	0.0-1.0	.37	.37			
423D2:													
Bucknell---------------	90	0-6	27-38	1.45-1.50	0.20-0.60	0.17-0.21	3.0-5.9	2.0-3.0	.37	.37	3	7	38
		6-53	38-50	1.55-1.65	0.0000-0.20	0.13-0.17	6.0-8.9	0.0-0.5	.32	.32			
		53-80	30-40	1.60-1.70	0.06-0.20	0.14-0.18	6.0-8.9	0.0-0.5	.32	.32			
424D:													
Lindley----------------	52	0-9	18-27	1.20-1.40	0.60-2.00	0.16-0.18	0.0-2.9	1.5-2.5	.32	.32	5	6	48
		9-62	25-35	1.40-1.60	0.20-0.60	0.14-0.18	3.0-5.9	0.1-1.0	.32	.32			
		62-80	18-32	1.45-1.65	0.20-0.60	0.12-0.16	3.0-5.9	0.1-0.5	.32	.32			
Keswick----------------	43	0-9	22-27	1.45-1.50	0.60-2.00	0.17-0.22	3.0-5.9	2.0-3.0	.32	.32	3	6	48
		9-29	35-60	1.55-1.60	0.06-0.20	0.11-0.15	6.0-8.9	0.0-0.5	.37	.37			
		29-80	30-40	1.60-1.75	0.20-0.60	0.12-0.16	3.0-5.9	0.0-0.5	.37	.37			
424D2:													
Lindley----------------	52	0-7	18-27	1.20-1.40	0.60-2.00	0.16-0.18	0.0-2.9	1.5-2.5	.32	.32	5	6	48
		7-60	25-35	1.40-1.60	0.20-0.60	0.14-0.18	3.0-5.9	0.1-1.0	.32	.32			
		60-80	18-32	1.45-1.65	0.20-0.60	0.12-0.16	3.0-5.9	0.1-0.5	.32	.32			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi- bility group	Wind erodi- bility index
		In	Pct	g/cc	In/hr	In/in	Pct	Pct					
424D2:													
Keswick---------------	43	0-7	27-40	1.45-1.50	0.20-0.60	0.17-0.19	3.0-5.9	1.5-2.5	.37	.37	3	4	86
		7-27	35-60	1.55-1.60	0.06-0.20	0.11-0.15	6.0-8.9	0.0-0.5	.37	.37			
		27-80	30-40	1.60-1.75	0.20-0.60	0.12-0.16	3.0-5.9	0.0-0.5	.37	.37			
424E2:													
Lindley---------------	48	0-7	18-27	1.20-1.40	0.60-2.00	0.16-0.18	0.0-2.9	1.5-2.5	.32	.32	5	6	48
		7-59	25-35	1.40-1.60	0.20-0.60	0.14-0.18	3.0-5.9	0.1-1.0	.32	.32			
		59-80	18-32	1.45-1.65	0.20-0.60	0.12-0.16	3.0-5.9	0.1-0.5	.32	.32			
Keswick---------------	42	0-7	27-40	1.45-1.50	0.20-0.60	0.17-0.19	3.0-5.9	1.0-1.5	.37	.37	3	4	86
		7-25	35-60	1.55-1.60	0.06-0.20	0.11-0.15	6.0-8.9	0.0-0.5	.37	.37			
		25-80	30-40	1.60-1.75	0.20-0.60	0.12-0.16	3.0-5.9	0.0-0.5	.37	.37			
425D:													
Keswick---------------	90	0-9	22-27	1.45-1.50	0.60-2.00	0.17-0.22	3.0-5.9	2.0-3.0	.32	.32	3	6	48
		9-29	35-60	1.55-1.60	0.06-0.20	0.11-0.15	6.0-8.9	0.0-0.5	.37	.37			
		29-80	30-40	1.60-1.75	0.20-0.60	0.12-0.16	3.0-5.9	0.0-0.5	.37	.37			
425D2:													
Keswick---------------	90	0-7	27-40	1.45-1.50	0.20-0.60	0.17-0.19	3.0-5.9	1.5-2.5	.37	.37	3	4	86
		7-27	35-60	1.55-1.60	0.06-0.20	0.11-0.15	6.0-8.9	0.0-0.5	.37	.37			
		27-80	30-40	1.60-1.75	0.20-0.60	0.12-0.16	3.0-5.9	0.0-0.5	.37	.37			
428B:													
Ely-------------------	95	0-24	27-30	1.30-1.35	0.60-2.00	0.21-0.23	3.0-5.9	5.0-6.0	.28	.28	5	7	38
		24-47	28-35	1.30-1.40	0.60-2.00	0.18-0.20	3.0-5.9	1.0-3.0	.43	.43			
		47-80	20-30	1.40-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43			
430:													
Ackmore---------------	90	0-6	18-27	1.25-1.30	0.60-2.00	0.21-0.23	3.0-5.9	1.0-3.0	.32	.32	5	6	48
		6-22	18-30	1.25-1.30	0.60-2.00	0.21-0.23	3.0-5.9	1.0-3.0	.32	.32			
		22-80	26-38	1.30-1.40	0.60-2.00	0.18-0.20	6.0-8.9	3.0-5.0	.32	.32			
453:													
Tuskeego--------------	95	0-9	16-22	1.35-1.40	0.60-2.00	0.19-0.23	3.0-5.9	3.0-4.0	.37	.37	5	5	56
		9-19	18-30	1.40-1.50	0.06-0.20	0.18-0.22	---	1.0-2.0	.43	---			
		19-61	32-48	1.30-1.45	0.0000-0.06	0.13-0.17	6.0-8.9	0.0-2.0	.43	.43			
		61-80	28-40	1.40-1.50	0.06-0.20	0.16-0.19	3.0-5.9	0.0-1.0	.43	.43			
520:													
Coppock---------------	95	0-8	16-26	1.30-1.35	0.60-2.00	0.20-0.24	3.0-5.9	2.5-3.5	.32	.32	5	6	48
		8-25	16-27	1.30-1.40	0.60-2.00	0.18-0.22	3.0-5.9	0.0-1.0	.43	.43			
		25-45	25-35	1.30-1.40	0.60-2.00	0.17-0.21	3.0-5.9	0.0-0.5	.43	.43			
		45-80	24-40	1.40-1.45	0.60-2.00	0.15-0.19	3.0-5.9	0.0-0.5	.43	.43			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
		In	Pct	g/cc	In/hr	In/in	Pct	Pct					
520B:													
Coppock---------------	95	0-8	16-26	1.30-1.35	0.60-2.00	0.20-0.24	3.0-5.9	2.5-3.5	.32	.32	5	6	48
		8-25	16-27	1.30-1.40	0.60-2.00	0.18-0.22	3.0-5.9	0.0-1.0	.43	.43			
		25-45	25-35	1.30-1.40	0.60-2.00	0.17-0.21	3.0-5.9	0.0-0.5	.43	.43			
		45-80	24-40	1.40-1.45	0.60-2.00	0.15-0.19	3.0-5.9	0.0-0.5	.43	.43			
570C:													
Nira------------------	95	0-11	28-34	1.25-1.40	0.60-2.00	0.21-0.23	3.0-5.9	3.0-4.0	.28	.28	5	7	38
		11-40	30-38	1.25-1.40	0.60-2.00	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43			
		40-80	24-34	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
570C2:													
Nira------------------	95	0-8	28-34	1.25-1.40	0.60-2.00	0.21-0.23	3.0-5.9	2.2-3.2	.28	.28	5	7	38
		8-37	30-38	1.25-1.40	0.60-2.00	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43			
		37-80	24-34	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
571C2:													
Hedrick---------------	89	0-7	27-34	1.30-1.35	0.60-2.00	0.20-0.22	3.0-5.9	2.0-3.0	.32	.32	5	7	38
		7-48	27-37	1.30-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-1.0	.43	.43			
		48-69	24-32	1.40-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
		69-80	27-50	1.55-1.65	0.0000-0.20	0.13-0.17	3.0-5.9	2.2-3.2	.43	.43			
571D2:													
Hedrick---------------	95	0-7	27-34	1.30-1.35	0.60-2.00	0.20-0.22	3.0-5.9	2.0-3.0	.32	.32	5	7	38
		7-48	27-37	1.30-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-1.0	.43	.43			
		48-69	24-32	1.40-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
		69-80	27-50	1.55-1.65	0.0000-0.20	0.13-0.17	3.0-5.9	0.0-0.5	.32	.32			
572C2:													
Inton-----------------	90	0-8	27-34	1.30-1.35	0.60-2.00	0.20-0.22	3.0-5.9	1.5-2.0	.32	.32	5	7	38
		8-39	27-37	1.30-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-1.0	.43	.43			
		39-52	24-32	1.40-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
		52-80	27-50	1.55-1.65	0.0000-0.20	0.13-0.17	3.0-5.9	0.0-0.5	.32	.32			
572D2:													
Inton-----------------	90	0-7	27-34	1.30-1.35	0.60-2.00	0.20-0.22	3.0-5.9	2.0-3.0	.32	.32	5	7	38
		7-35	27-37	1.30-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-1.0	.43	.43			
		35-48	24-32	1.40-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
		48-80	27-50	1.55-1.65	0.0000-0.20	0.13-0.17	3.0-5.9	0.0-0.5	.32	.32			
587:													
Chequest--------------	90	0-14	30-35	1.30-1.35	0.20-0.60	0.18-0.20	6.0-8.9	3.0-4.0	.32	.32	5	7	38
		14-80	35-42	1.35-1.45	0.20-0.60	0.14-0.18	6.0-8.9	0.0-1.0	.43	.43			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi-bility group	Wind erodi-bility index
		In	Pct	g/cc	In/hr	In/in	Pct	Pct					
587+:													
Chequest	90	0-14	20-26	1.20-1.25	0.60-2.00	0.20-0.22	0.0-2.9	1.0-3.0	.37	.37	5	6	48
		14-80	35-42	1.35-1.45	0.20-0.60	0.14-0.18	6.0-8.9	0.0-1.0	.43	.43			
687B:													
Watkins	90	0-15	18-24	1.30-1.35	0.60-2.00	0.20-0.24	3.0-5.9	2.5-3.5	.28	.28	5	6	48
		15-65	25-35	1.35-1.40	0.60-2.00	0.15-0.19	3.0-5.9	1.0-2.0	.43	.43			
		65-80	25-32	1.40-1.45	0.60-2.00	0.14-0.18	3.0-5.9	0.0-1.0	.43	.43			
688:													
Koszta	90	0-15	18-24	1.30-1.40	0.60-2.00	0.20-0.24	3.0-5.9	3.0-4.0	.28	.28	5	6	48
		15-80	28-35	1.30-1.45	0.60-2.00	0.15-0.19	3.0-5.9	0.0-0.5	.43	.43			
722:													
Nodaway	36	0-9	18-27	1.25-1.35	0.60-2.00	0.20-0.23	0.0-2.9	1.5-2.5	.32	.32	5	6	48
		9-80	18-28	1.25-1.35	0.60-2.00	0.20-0.23	3.0-5.9	0.0-0.5	.43	.43			
Ackmore	32	0-6	18-27	1.25-1.30	0.60-2.00	0.21-0.23	3.0-5.9	1.0-3.0	.32	.32	5	6	48
		6-22	18-30	1.25-1.30	0.60-2.00	0.21-0.23	3.0-5.9	1.0-3.0	.32	.32			
		22-80	26-38	1.30-1.40	0.60-2.00	0.18-0.20	6.0-8.9	3.0-5.0	.32	.32			
Vesser	22	0-13	20-26	1.30-1.35	0.60-2.00	0.20-0.24	3.0-5.9	3.0-4.0	.28	.28	5	6	48
		13-31	18-22	1.35-1.40	0.60-2.00	0.18-0.22	3.0-5.9	1.0-2.0	.43	.43			
		31-80	30-35	1.40-1.45	0.60-2.00	0.17-0.21	3.0-5.9	0.0-1.0	.43	.43			
730B:													
Nodaway	46	0-9	18-27	1.25-1.35	0.60-2.00	0.20-0.23	0.0-2.9	1.5-2.5	.32	.32	5	6	48
		9-80	18-28	1.25-1.35	0.60-2.00	0.20-0.23	3.0-5.9	0.0-0.5	.43	.43			
Coppock	27	0-8	16-26	1.30-1.35	0.60-2.00	0.20-0.24	3.0-5.9	2.5-3.5	.32	.32	5	6	48
		8-25	16-27	1.30-1.40	0.60-2.00	0.18-0.22	3.0-5.9	0.0-1.0	.43	.43			
		25-45	25-35	1.30-1.40	0.60-2.00	0.17-0.21	3.0-5.9	0.0-0.5	.43	.43			
		45-80	24-40	1.40-1.45	0.60-2.00	0.15-0.19	3.0-5.9	0.0-0.5	.43	.43			
Cantril	17	0-19	14-27	1.40-1.45	0.60-2.00	0.17-0.19	0.0-2.9	2.5-3.5	.28	.28	5	6	48
		19-80	27-35	1.45-1.75	0.60-2.00	0.14-0.16	3.0-5.9	0.0-1.0	.32	.32			
779:													
Kalona	95	0-20	36-39	1.35-1.40	0.20-0.60	0.18-0.20	6.0-8.9	5.0-6.0	.32	.32	5	4	86
		20-51	36-42	1.40-1.45	0.20-0.60	0.14-0.18	6.0-8.9	2.0-3.0	.37	.37			
		51-80	26-34	1.45-1.50	0.20-0.60	0.18-0.20	3.0-5.9	0.0-0.5	.37	.37			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
		In	Pct	g/cc	In/hr	In/in	Pct	Pct					
792C2:													
Armstrong----------------	90	0-9	35-42	1.45-1.50	0.20-0.60	0.18-0.20	3.0-5.9	2.0-3.0	.32	.32	3	4	86
		9-45	36-60	1.55-1.60	0.06-0.20	0.11-0.16	6.0-8.9	0.0-1.0	.32	.32			
		45-80	30-36	1.55-1.70	0.20-0.60	0.14-0.16	3.0-5.9	0.0-0.5	.32	.32			
792D2:													
Armstrong----------------	95	0-9	35-42	1.45-1.50	0.20-0.60	0.18-0.20	3.0-5.9	2.0-3.0	.32	.32	3	4	86
		9-43	36-60	1.55-1.60	0.06-0.20	0.11-0.16	6.0-8.9	0.0-1.0	.32	.32			
		43-80	30-36	1.55-1.70	0.20-0.60	0.14-0.16	3.0-5.9	0.0-0.5	.32	.32			
795C2:													
Ashgrove-----------------	95	0-7	27-40	1.45-1.50	0.20-0.60	0.18-0.20	3.0-5.9	1.0-2.0	.43	.43	3	7	38
		7-62	40-60	1.50-1.65	0.0000-0.06	0.12-0.14	6.0-8.9	0.0-0.5	.32	.32			
		62-80	27-32	1.45-1.65	0.20-0.60	0.12-0.16	3.0-5.9	0.0-0.0	.32	.32			
795D2:													
Ashgrove-----------------	82	0-7	27-40	1.45-1.50	0.20-0.60	0.18-0.20	3.0-5.9	1.0-2.0	.43	.43	3	7	38
		7-60	40-60	1.50-1.65	0.0000-0.06	0.12-0.14	6.0-8.9	0.0-0.5	.32	.32			
		60-80	27-32	1.45-1.65	0.20-0.60	0.12-0.16	3.0-5.9	0.0-0.0	.32	.32			
822D2:													
Lamoni-------------------	90	0-6	27-40	1.45-1.50	0.20-0.60	0.17-0.21	3.0-5.9	2.2-3.2	.37	.37	3	7	38
		6-61	38-50	1.55-1.65	0.0000-0.20	0.13-0.17	6.0-8.9	0.5-2.0	.37	.37			
		61-80	32-40	1.60-1.70	0.06-0.20	0.14-0.18	6.0-8.9	0.0-0.5	.37	.37			
876B:													
Ladoga-------------------	90	0-14	18-27	1.30-1.35	0.60-2.00	0.22-0.24	0.0-2.9	2.5-3.5	.32	.32	5	6	48
		14-54	36-42	1.30-1.40	0.20-0.60	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43			
		54-80	24-32	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
876C2:													
Ladoga-------------------	90	0-8	27-35	1.30-1.35	0.60-2.00	0.20-0.22	0.0-2.9	2.0-3.0	.32	.32	5	7	38
		8-48	36-42	1.30-1.40	0.20-0.60	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43			
		48-80	24-32	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
876D2:													
Ladoga-------------------	90	0-8	27-35	1.30-1.35	0.60-2.00	0.20-0.22	0.0-2.9	2.0-3.0	.32	.32	5	7	38
		8-46	36-42	1.30-1.40	0.20-0.60	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43			
		46-80	24-32	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
880B:													
Clinton------------------	95	0-15	16-26	1.30-1.40	0.60-2.00	0.20-0.22	0.0-2.9	2.0-3.0	.37	.37	5	6	48
		15-39	36-42	1.35-1.45	0.20-0.60	0.16-0.20	3.0-5.9	0.0-0.5	.37	.37			
		39-60	24-35	1.40-1.55	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.37	.37			
		60-80	17-30	1.45-1.65	0.60-2.00	0.14-0.18	0.0-2.9	0.0-0.5	.32	.32			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi- bility group	Wind erodi- bility index
		In	Pct	g/cc	In/hr	In/in	Pct	Pct					
880C2:													
Clinton	95	0-8	27-34	1.30-1.40	0.60-2.00	0.18-0.20	0.0-2.9	1.5-2.5	.37	.37	5	7	38
		8-30	36-42	1.35-1.45	0.20-0.60	0.16-0.20	3.0-5.9	0.0-0.5	.37	.37			
		30-53	24-35	1.40-1.55	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.37	.37			
		53-80	17-30	1.45-1.65	0.60-2.00	0.14-0.18	0.0-2.9	0.0-0.5	.32	.32			
880D2:													
Clinton	95	0-8	27-34	1.30-1.40	0.60-2.00	0.18-0.20	0.0-2.9	1.5-2.5	.37	.37	5	8	38
		8-28	36-42	1.35-1.45	0.20-0.60	0.16-0.20	3.0-5.9	0.0-0.5	.37	.37			
		28-51	24-35	1.40-1.55	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.37	.37			
		51-80	17-30	1.45-1.65	0.60-2.00	0.14-0.18	0.0-2.9	0.0-0.5	.32	.32			
881B:													
Otley	95	0-17	28-34	1.25-1.35	0.60-2.00	0.21-0.23	3.0-5.9	3.0-4.0	.28	.28	5	7	38
		17-40	36-42	1.30-1.40	0.60-2.00	0.18-0.20	3.0-5.9	1.0-2.0	.43	.43			
		40-80	24-35	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
911B:													
Colo	57	0-38	27-36	1.28-1.32	0.60-2.00	0.21-0.23	3.0-5.9	5.0-7.0	.28	.28	5	7	38
		38-44	30-35	1.25-1.35	0.60-2.00	0.18-0.20	3.0-5.9	3.0-4.0	.28	.28			
		44-80	25-35	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	1.0-2.0	.32	.32			
Ely	38	0-24	27-30	1.30-1.35	0.60-2.00	0.21-0.23	3.0-5.9	4.0-6.0	.28	.28	5	7	38
		24-47	28-35	1.30-1.40	0.60-2.00	0.18-0.20	3.0-5.9	1.0-3.0	.43	.43			
		47-80	20-30	1.40-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43			
993D2:													
Gara	48	0-9	27-35	1.50-1.55	0.20-0.60	0.16-0.18	3.0-5.9	2.0-3.0	.32	.32	5	6	48
		9-67	25-38	1.55-1.75	0.20-0.60	0.16-0.18	3.0-5.9	0.0-0.5	.32	.32			
		67-80	24-38	1.65-1.75	0.20-0.60	0.16-0.18	3.0-5.9	0.0-0.5	.37	---			
Armstrong	42	0-9	35-42	1.45-1.50	0.20-0.60	0.18-0.20	3.0-5.9	2.0-3.0	.32	.32	3	4	86
		9-43	36-60	1.55-1.60	0.06-0.20	0.11-0.16	6.0-8.9	0.0-1.0	.32	.32			
		43-80	30-36	1.55-1.70	0.20-0.60	0.14-0.16	3.0-5.9	0.0-0.5	.32	.32			
993E2:													
Gara	48	0-9	27-35	1.50-1.55	0.20-0.60	0.16-0.18	3.0-5.9	2.0-3.0	.32	.32	5	6	48
		9-65	25-38	1.55-1.75	0.20-0.60	0.16-0.18	3.0-5.9	0.0-0.5	.32	.32			
		65-80	24-38	1.65-1.75	0.20-0.60	0.16-0.18	3.0-5.9	0.0-0.5	.37	---			
Armstrong	42	0-9	35-42	1.45-1.50	0.20-0.60	0.18-0.20	3.0-5.9	2.0-3.0	.32	.32	3	4	86
		9-40	36-60	1.55-1.60	0.06-0.20	0.11-0.16	6.0-8.9	0.0-1.0	.32	.32			
		40-80	30-36	1.55-1.70	0.20-0.60	0.14-0.16	3.0-5.9	0.0-0.5	.32	.32			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi- bility group	Wind erodi- bility index
		In	Pct	g/cc	In/hr	In/in	Pct	Pct					
994D2:													
Galland---------------	65	0-6	27-35	1.45-1.50	0.60-2.00	0.19-0.21	3.0-5.9	1.5-2.5	.37	.37	3	6	48
		6-47	35-48	1.50-1.65	0.06-0.20	0.14-0.19	6.0-8.9	0.0-0.5	.37	.37			
		47-80	10-45	1.55-1.75	0.60-6.00	0.11-0.13	0.0-2.9	0.0-0.5	.24	.24			
Douds-----------------	25	0-7	20-27	1.45-1.50	0.60-2.00	0.15-0.17	0.0-2.9	1.5-2.5	.32	.32	5	6	48
		7-56	26-35	1.45-1.65	0.60-2.00	0.15-0.17	3.0-5.9	0.0-1.0	.32	.32			
		56-80	5-30	1.55-1.75	0.60-6.00	0.11-0.13	0.0-2.9	0.0-0.5	.32	.32			
994E2:													
Galland---------------	55	0-6	27-35	1.45-1.50	0.60-2.00	0.19-0.21	3.0-5.9	1.5-2.5	.37	.37	3	6	48
		6-54	35-48	1.50-1.65	0.06-0.20	0.14-0.19	6.0-8.9	0.0-0.5	.37	.37			
		54-80	10-45	1.55-1.75	0.60-6.00	0.11-0.13	0.0-2.9	0.0-0.5	.24	.24			
Douds-----------------	35	0-6	20-27	1.45-1.50	0.60-2.00	0.15-0.17	0.0-2.9	1.5-2.5	.32	.32	5	6	48
		6-54	26-35	1.45-1.65	0.60-2.00	0.15-0.17	3.0-5.9	0.0-1.0	.32	.32			
		54-80	5-30	1.55-1.75	0.60-6.00	0.11-0.13	0.0-2.9	0.0-0.5	.32	.32			
999F:													
Nordness--------------	62	0-7	18-24	1.30-1.35	0.60-2.00	0.20-0.22	0.0-2.9	2.0-3.0	.32	.32	1	6	48
		7-11	22-35	1.35-1.60	0.06-0.20	0.12-0.15	6.0-8.9	0.0-0.5	.37	.37			
		11-14	---	---	0.0000-0.06	---	---	---	---	---			
Eleva-----------------	23	0-4	5-15	1.40-1.60	0.60-6.00	0.10-0.18	0.0-2.9	1.0-3.0	.24	.24	3	3	86
		4-17	10-18	1.50-1.60	0.60-6.00	0.09-0.19	0.0-2.9	0.1-1.0	.24	.24			
		17-24	1-8	1.50-1.70	2.00-20	0.04-0.10	---	0.0-0.5	.15	.15			
		24-80	---	---	0.0000-0.06	---	---	---	---	---			
999G:													
Nordness--------------	62	0-7	18-24	1.30-1.35	0.60-2.00	0.20-0.22	0.0-2.9	2.0-3.0	.32	.32	1	6	48
		7-11	22-35	1.35-1.60	0.06-0.20	0.12-0.15	6.0-8.9	0.0-0.5	.37	.37			
		11-14	---	---	0.0000-0.06	---	---	---	---	---			
Eleva-----------------	23	0-4	5-15	1.40-1.60	0.60-6.00	0.10-0.18	0.0-2.9	1.0-3.0	.24	.24	3	3	86
		4-17	10-18	1.50-1.60	0.60-6.00	0.09-0.19	0.0-2.9	0.1-1.0	.24	.24			
		17-24	1-8	1.50-1.70	2.00-20	0.04-0.10	---	0.0-0.5	.15	.15			
		24-80	---	---	0.0000-0.06	---	---	---	---	---			
1075:													
Givin-----------------	90	0-12	18-26	1.30-1.40	0.60-2.00	0.22-0.24	3.0-5.9	3.0-4.0	.32	.32	5	6	48
		12-42	36-42	1.30-1.45	0.20-0.60	0.18-0.20	3.0-5.9	0.5-1.0	.43	.43			
		42-80	27-34	1.40-1.50	0.20-0.60	0.18-0.20	3.0-5.9	0.0-0.5	.43	.43			
1220:													
Nodaway---------------	90	0-9	18-27	1.25-1.35	0.60-2.00	0.20-0.23	0.0-2.9	1.5-2.5	.32	.32	5	6	48
		9-80	18-28	1.25-1.35	0.60-2.00	0.20-0.23	3.0-5.9	0.0-0.5	.43	.43			

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
		In	Pct	g/cc	In/hr	In/in	Pct	Pct					
1279:													
Taintor---------------	95	0-6	27-36	1.30-1.40	0.20-0.60	0.21-0.23	3.0-5.9	5.0-6.0	.28	.28	5	7	38
		6-17	30-36	1.30-1.40	0.20-0.60	0.21-0.23	3.0-5.9	2.0-3.0	.32	.32			
		17-58	35-44	1.30-1.45	0.20-0.60	0.14-0.18	6.0-8.9	0.0-1.0	.43	.43			
		58-80	24-34	1.40-1.50	0.60-2.00	0.18-0.20	3.0-5.9	0.0-1.0	.43	.43			
1280:													
Mahaska---------------	95	0-18	27-32	1.30-1.40	0.60-2.00	0.21-0.23	3.0-5.9	5.0-6.0	.28	.28	5	7	38
		18-51	36-42	1.30-1.45	0.60-2.00	0.14-0.18	3.0-5.9	1.0-2.0	.43	.43			
		51-80	24-32	1.40-1.45	0.60-2.00	0.18-0.20	3.0-5.9	0.0-1.0	.43	.43			
1315:													
Nodaway---------------	57	0-9	18-27	1.25-1.35	0.60-2.00	0.20-0.23	0.0-2.9	1.5-2.5	.32	.32	5	6	48
		9-80	18-28	1.25-1.35	0.60-2.00	0.20-0.23	3.0-5.9	0.0-0.5	.43	.43			
Klum------------------	38	0-8	5-18	1.50-1.60	2.00-6.00	0.15-0.18	0.0-2.9	1.5-2.5	.20	.20	5	3	86
		8-20	5-18	1.50-1.60	2.00-6.00	0.13-0.18	0.0-2.9	0.0-0.5	.20	.20			
		20-80	2-18	1.50-1.60	2.00-20	0.02-0.15	0.0-2.9	0.0-0.5	.17	.17			
5010:													
Pits, sand and gravel-	100	0-80	0-2	---	6.00-20	0.02-0.07	---	---	---	---	5	---	---
5020:													
Pits and Dumps--------	100	0-80	---	---	0.01-20	---	---	---	---	---	5	8	---
5030:													
Pits, limestone quarries-------------	100	0-80	---	---	0.01-20	---	---	---	---	---	5	8	---
5040:													
Orthents, loamy-------	100	0-80	2-18	1.50-1.70	0.60-2.00	0.08-0.14	0.0-2.9	---	.24	---	5	3	86
5048:													
Aquents.													
5060:													
Pits, clay.													
5080:													
Orthents, sanitary landfill.													

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi- bility group	Wind erodi- bility index
		In	Pct	g/cc	In/hr	In/in	Pct	Pct					
6051:													
Vesser----------------	93	0-13	20-26	1.30-1.35	0.60-2.00	0.20-0.24	3.0-5.9	3.0-4.0	.28	.28	5	6	48
		13-31	18-22	1.35-1.40	0.60-2.00	0.18-0.22	3.0-5.9	1.0-2.0	.43	.43			
		31-80	30-35	1.40-1.45	0.60-2.00	0.17-0.21	3.0-5.9	0.0-1.0	.43	.43			
6054:													
Zook------------------	95	0-9	35-40	1.30-1.35	0.20-0.60	0.21-0.23	6.0-8.9	5.0-7.0	.37	.37	5	7	38
		9-51	36-45	1.30-1.45	0.06-0.20	0.11-0.13	6.0-8.9	2.0-4.0	.28	.28			
		51-80	20-45	1.30-1.45	0.06-0.60	0.11-0.22	6.0-8.9	0.0-1.0	.28	.28			
6133:													
Colo------------------	90	0-16	27-36	1.28-1.32	0.60-2.00	0.21-0.23	3.0-5.9	5.0-7.0	.28	.28	5	7	38
		16-49	30-35	1.25-1.35	0.60-2.00	0.18-0.20	3.0-5.9	3.0-4.0	.28	.28			
		49-80	25-35	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	1.0-2.0	.32	.32			
6133+:													
Colo------------------	90	0-14	20-26	1.25-1.30	0.60-2.00	0.22-0.24	3.0-5.9	3.0-5.0	.28	.28	5	6	48
		14-59	30-35	1.25-1.35	0.60-2.00	0.18-0.20	3.0-5.9	3.0-4.0	.28	.28			
		59-80	25-35	1.35-1.45	0.60-2.00	0.18-0.20	3.0-5.9	1.0-2.0	.32	.32			
6220:													
Nodaway---------------	90	0-9	18-27	1.25-1.35	0.60-2.00	0.20-0.23	0.0-2.9	1.5-2.5	.32	.32	5	6	48
		9-80	18-28	1.25-1.35	0.60-2.00	0.20-0.23	3.0-5.9	0.0-0.5	.43	.43			
6315:													
Nodaway---------------	57	0-9	18-27	1.25-1.35	0.60-2.00	0.20-0.23	0.0-2.9	1.5-2.5	.32	.32	5	6	48
		9-80	18-28	1.25-1.35	0.60-2.00	0.20-0.23	3.0-5.9	0.0-0.5	.43	.43			
Klum------------------	38	0-8	5-18	1.50-1.60	2.00-6.00	0.15-0.18	0.0-2.9	1.5-2.5	.20	.20	5	3	86
		8-20	5-18	1.50-1.60	2.00-6.00	0.13-0.18	0.0-2.9	0.0-0.5	.20	.20			
		20-80	3-18	1.50-1.60	2.00-20	0.02-0.15	0.0-2.9	0.0-0.5	.17	.17			
6422:													
Amana-----------------	89	0-15	18-27	1.20-1.30	0.60-2.00	0.22-0.24	3.0-5.9	3.5-4.5	.28	.28	5	6	48
		15-37	18-30	1.25-1.40	0.60-2.00	0.20-0.22	3.0-5.9	1.0-2.0	.37	.37			
		37-80	18-26	1.25-1.40	0.60-2.00	0.20-0.22	3.0-5.9	0.0-1.0	.37	.37			
6587:													
Chequest--------------	90	0-14	30-35	1.30-1.35	0.20-0.60	0.18-0.20	6.0-8.9	3.0-4.0	.32	.32	5	7	38
		14-80	35-42	1.35-1.45	0.20-0.60	0.14-0.18	6.0-8.9	0.0-1.0	.43	.43			
AW:													
Animal waste.													

Table 19.--Physical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi-bility group	Wind erodi-bility index
		In	Pct	g/cc	In/hr	In/in	Pct	Pct					
SL:													
Sewage lagoon.													
W:													
Water.													

Table 20.--Chemical Properties of the Soils

(Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Percent of map unit	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate
		In	meq/100 g	meq/100 g	pH	Pct
8B:						
Judson	95	0-28	25-30	---	5.6-7.3	0
		28-58	25-30	---	5.6-7.3	0
		58-80	25-30	---	6.1-7.8	0
8C:						
Judson	95	0-25	25-30	---	5.6-7.3	0
		25-58	25-30	---	5.6-7.3	0
		58-80	25-30	---	6.1-7.8	0
13B:						
Olmitz	30	0-9	20-25	---	5.6-7.3	0
		9-32	20-25	---	5.6-7.3	0
		32-80	20-25	---	5.1-6.5	0
Vesser	28	0-12	25-30	---	5.6-7.3	0
		12-31	20-25	---	5.1-6.0	0
		31-80	25-30	---	5.6-6.5	0
Zook	27	0-9	36-41	---	5.6-7.3	0
		9-51	36-41	---	5.6-7.8	0
		51-80	30-36	---	5.6-7.8	0
24D2:						
Shelby	95	0-7	20-25	---	5.1-7.3	0
		7-12	20-25	---	5.1-7.3	0
		12-52	20-25	---	5.1-7.3	0
		52-80	20-25	---	6.6-8.4	0-30
24E2:						
Shelby	90	0-7	20-25	---	5.1-7.3	0
		7-12	20-25	---	5.1-7.3	0
		12-50	20-25	---	5.1-7.3	0
		50-80	20-25	---	6.6-8.4	0-30
51:						
Vesser	90	0-13	25-30	---	5.6-7.3	0
		13-31	20-25	---	5.1-6.0	0
		31-80	25-30	---	5.1-6.5	0
51B:						
Vesser	95	0-12	25-30	---	5.6-7.3	0
		12-31	20-25	---	5.1-6.0	0
		31-80	25-30	---	5.1-6.5	0
54:						
Zook	90	0-9	36-41	---	5.6-7.3	0
		9-51	36-41	---	5.6-7.8	0
		51-80	30-36	---	5.6-7.8	0
54+:						
Zook	90	0-14	25-30	---	5.6-7.3	0
		14-56	36-41	---	5.6-7.8	0
		56-80	30-36	---	5.6-7.8	0
56B:						
Cantril	90	0-19	15-20	---	5.1-7.3	0
		19-80	20-25	---	5.1-6.5	0

Table 20.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate
		In	meq/100 g	meq/100 g	pH	Pct
56C:						
Cantril--------------	90	0-19	15-20	---	5.1-7.3	0
		19-80	20-25	---	5.1-6.5	0
65D2:						
Lindley--------------	95	0-7	10-16	---	4.5-7.3	0
		7-60	15-20	---	4.5-6.5	0
		60-80	10-16	---	6.1-7.8	0
65E:						
Lindley--------------	95	0-9	10-16	---	4.5-7.3	0
		9-61	15-20	---	4.5-6.5	0
		61-80	10-16	---	6.1-7.8	0
65E2:						
Lindley--------------	90	0-7	10-16	---	4.5-7.3	0
		7-59	15-20	---	4.5-6.5	0
		59-80	10-16	---	6.1-7.8	0
65F:						
Lindley--------------	90	0-9	10-16	---	4.5-7.3	0
		9-60	15-20	---	4.5-6.5	0
		60-80	10-16	---	6.1-7.8	0
65F2:						
Lindley--------------	90	0-7	10-16	---	4.5-7.3	0
		7-58	15-20	---	4.5-6.5	0
		58-80	10-16	---	6.1-7.8	0
65G:						
Lindley--------------	95	0-9	10-16	---	4.5-7.3	0
		9-59	15-20	---	4.5-6.5	0
		59-80	10-16	---	6.1-7.8	0
74:						
Rubio----------------	95	0-8	20-25	---	5.1-7.3	0
		8-14	15-20	---	5.1-6.0	0
		14-30	---	25-30	5.1-5.5	0
		30-80	20-25	---	5.1-7.3	0
75:						
Givin----------------	95	0-12	20-25	---	5.6-7.3	0
		12-42	---	20-25	5.1-5.5	0
		42-80	20-25	---	5.1-6.0	0
75B:						
Givin----------------	95	0-12	20-25	---	5.6-7.3	0
		12-40	---	20-25	5.1-5.5	0
		40-80	20-25	---	5.1-6.0	0
76B:						
Ladoga---------------	95	0-14	20-25	---	6.1-7.3	0
		14-54	20-25	---	5.1-6.0	0
		54-80	20-25	---	5.1-6.5	0
76B2:						
Ladoga---------------	90	0-10	25-30	---	6.1-7.3	0
		10-50	25-30	---	5.1-6.0	0
		50-80	20-25	---	5.1-6.5	0

Table 20.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate
		In	meq/100 g	meq/100 g	pH	Pct
76C:						
Ladoga	95	0-10	20-25	---	6.1-7.3	0
		10-50	20-25	---	5.1-6.0	0
		50-80	20-25	---	5.1-6.5	0
76C2:						
Ladoga	90	0-8	25-30	---	6.1-7.3	0
		8-48	25-30	---	5.1-6.0	0
		48-80	20-25	---	5.1-6.5	0
76D2:						
Ladoga	90	0-8	25-30	---	6.1-7.3	0
		8-46	25-30	---	5.1-6.0	0
		46-80	20-25	---	5.1-6.5	0
80B:						
Clinton	95	0-15	15-20	---	5.1-7.3	0
		15-39	---	25-30	4.5-6.0	0
		39-80	20-25	---	6.1-6.5	0
80C:						
Clinton	95	0-15	15-20	---	5.1-7.3	0
		15-37	---	25-30	4.5-6.0	0
		37-80	20-25	---	6.1-6.5	0
80C2:						
Clinton	90	0-8	25-30	---	5.1-7.3	0
		8-30	---	25-30	4.5-6.0	0
		30-80	20-25	---	6.1-6.5	0
80D:						
Clinton	90	0-15	15-20	---	5.1-7.3	0
		15-35	---	25-30	4.5-6.0	0
		35-80	20-25	---	6.1-6.5	0
80D2:						
Clinton	90	0-8	25-30	---	5.1-7.3	0
		8-28	---	25-30	4.5-6.0	0
		28-80	20-25	---	6.1-6.5	0
87B:						
Colo	68	0-16	36-41	---	5.6-7.3	0
		16-46	36-41	---	5.6-7.3	0
		46-80	30-36	---	6.1-7.3	0
Zook	32	0-9	36-41	---	5.6-7.3	0
		9-51	36-41	---	5.6-7.8	0
		51-80	30-36	---	5.6-7.8	0
93D2:						
Shelby	60	0-7	20-25	---	5.1-7.3	0
		7-12	20-25	---	5.1-7.3	0
		12-52	20-25	---	5.1-7.3	0
		52-80	20-25	---	6.6-8.4	0-30
Adair	40	0-8	30-35	---	5.6-7.3	---
		8-42	41-50	---	5.1-6.5	---
		42-80	25-30	---	5.6-7.8	5-10

Table 20.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate
		In	meq/100 g	meq/100 g	pH	Pct
122:						
Sperry	95	0-12	25-30	---	5.6-7.3	0
		12-20	20-25	---	5.6-7.3	0
		20-32	30-36	---	5.1-6.5	0
		32-80	25-30	---	5.6-6.5	0
133:						
Colo	95	0-16	36-41	---	5.6-7.3	0
		16-49	36-41	---	5.6-7.3	0
		49-80	30-36	---	6.1-7.3	0
133+:						
Colo	90	0-14	25-30	---	5.6-7.3	0
		14-59	36-41	---	5.6-7.3	0
		59-80	30-36	---	6.1-7.3	0
133B:						
Colo	90	0-16	36-41	---	5.6-7.3	0
		16-46	36-41	---	5.6-7.3	0
		46-80	30-36	---	6.1-7.3	0
163E:						
Fayette	90	0-10	15-20	---	5.1-7.3	0
		10-56	15-20	---	4.5-6.5	0
		56-80	15-20	---	5.1-7.8	0-15
163E2:						
Fayette	90	0-8	18-25	---	5.1-7.3	0
		8-54	---	15-20	4.5-6.0	0
		54-80	15-20	---	5.1-7.8	0-15
163F:						
Fayette	90	0-10	15-20	---	5.1-7.3	0
		10-54	15-20	---	4.5-6.5	0
		54-80	15-20	---	5.1-7.8	0-15
179D2:						
Gara	90	0-9	25-30	---	5.6-7.3	0
		9-67	25-30	---	4.5-6.5	0
		67-80	25-30	---	5.6-8.4	0-25
179E:						
Gara	95	0-13	20-25	---	5.6-7.3	0
		13-69	20-25	---	4.5-6.5	0
		69-80	20-25	---	6.6-8.4	0-25
179E2:						
Gara	90	0-9	25-30	---	5.6-7.3	0
		9-65	25-30	---	4.5-6.5	0
		65-80	25-30	---	5.6-8.4	0-25
179F2:						
Gara	95	0-9	25-30	---	5.6-7.3	0
		9-63	25-30	---	4.5-6.5	0
		63-80	25-30	---	5.6-8.4	0-25
180:						
Keomah	95	0-7	15-20	---	4.5-7.3	0
		7-14	15-20	---	4.5-7.3	---
		14-25	---	25-30	4.5-5.5	0
		25-80	15-20	---	5.1-7.3	0

Table 20.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate
		In	meq/100 g	meq/100 g	pH	Pct
220:						
Nodaway----------------	90	0-9	20-25	---	6.1-7.3	0
		9-80	20-25	---	6.1-7.3	0
222C:						
Clarinda---------------	90	0-11	36-41	---	5.1-7.3	---
		11-38	41-50	---	5.1-6.5	---
		38-80	41-50	---	5.6-8.4	0-30
222C2:						
Clarinda---------------	90	0-7	36-41	---	5.1-7.3	---
		7-34	41-50	---	5.1-6.5	---
		34-80	41-50	---	5.6-8.4	0-30
223C2:						
Rinda------------------	90	0-9	30-36	---	5.6-7.3	---
		9-20	30-36	---	5.1-6.5	---
		20-80	41-50	---	5.1-7.3	---
273C:						
Olmitz-----------------	95	0-9	20-25	---	5.6-7.3	0
		9-32	20-25	---	5.6-7.3	0
		32-80	20-25	---	5.1-6.5	0
279:						
Taintor----------------	95	0-6	36-41	---	5.6-7.3	0
		6-17	36-41	---	5.6-7.3	0
		17-58	30-36	---	5.6-6.5	0
		58-80	25-30	---	6.1-7.8	0
280:						
Mahaska----------------	95	0-18	30-36	---	5.1-7.3	0
		18-51	---	30-36	4.5-6.0	0
		51-80	25-30	---	5.6-7.3	0
280B:						
Mahaska----------------	90	0-18	30-36	---	5.1-7.3	0
		18-51	---	30-36	4.5-6.0	0
		51-80	25-30	---	5.6-7.3	0
281B:						
Otley------------------	90	0-17	25-30	---	5.1-7.3	0
		17-40	---	25-30	5.1-5.5	0
		40-80	25-30	---	5.6-7.3	0
281B2:						
Otley------------------	90	0-9	25-30	---	5.1-7.3	---
		9-13	25-30	---	5.1-7.3	0
		13-36	---	25-30	5.1-5.5	0
		36-80	25-30	---	5.6-7.3	0
281C:						
Otley------------------	95	0-17	25-30	---	5.1-7.3	0
		17-39	---	25-30	5.1-5.5	0
		39-80	25-30	---	5.6-7.3	0
281C2:						
Otley------------------	90	0-8	25-30	---	5.1-7.3	---
		8-11	25-30	---	5.1-7.3	0
		11-34	---	25-30	5.1-5.5	0
		34-80	25-30	---	5.6-7.3	0

Table 20.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate
		In	meq/100 g	meq/100 g	pH	Pct
281D2:						
Otley----------------	90	0-7	25-30	---	5.1-7.3	---
		7-10	25-30	---	5.1-7.3	0
		10-33	---	25-30	5.1-5.5	0
		33-80	25-30	---	5.6-7.3	0
293C:						
Chelsea--------------	57	0-6	5.0-10	---	5.6-7.3	0
		6-80	5.0-10	---	5.1-6.5	0
Fayette--------------	38	0-10	15-20	---	5.1-7.3	0
		10-60	15-20	---	4.5-6.5	0
		60-80	15-20	---	5.1-7.8	0-15
293D:						
Chelsea--------------	57	0-6	5.0-10	---	5.6-7.3	0
		6-80	5.0-10	---	5.1-6.5	0
Fayette--------------	38	0-10	15-20	---	5.1-7.3	0
		10-58	15-20	---	4.5-6.5	0
		58-80	15-20	---	5.1-7.8	0-15
293E:						
Chelsea--------------	57	0-6	5.0-10	---	5.6-7.3	0
		6-80	5.0-10	---	5.1-6.5	0
Fayette--------------	38	0-10	15-20	---	5.1-7.3	0
		10-56	15-20	---	4.5-6.5	0
		56-80	15-20	---	5.1-7.8	0-15
293F:						
Chelsea--------------	57	0-6	5.0-10	---	5.6-7.3	0
		6-80	5.0-10	---	5.1-6.5	0
Fayette--------------	38	0-10	15-20	---	5.1-7.3	0
		10-54	15-20	---	4.5-6.5	0
		54-80	15-20	---	5.1-7.8	0-15
294C:						
Billett--------------	65	0-8	5.0-13	---	5.6-7.8	---
		8-12	5.0-10	---	5.6-7.8	---
		12-30	15-20	---	5.1-6.5	---
		30-57	20-25	---	5.1-7.3	---
		57-80	20-25	---	5.6-7.3	---
Ladoga---------------	35	0-8	20-25	---	6.1-7.3	0
		8-41	20-23	---	5.1-7.3	0
		41-80	5.0-10	---	5.1-7.3	0
294D:						
Billett--------------	65	0-8	5.0-13	---	5.6-7.8	---
		8-12	5.0-10	---	5.6-7.8	---
		12-30	15-20	---	5.1-6.5	---
		30-57	20-25	---	5.1-7.3	---
		57-80	20-25	---	5.6-7.3	---
Ladoga---------------	35	0-8	20-25	---	6.1-7.3	0
		8-41	20-23	---	5.1-7.3	0
		41-80	5.0-10	---	5.1-7.3	0

Table 20.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate
		In	meq/100 g	meq/100 g	pH	Pct
313F2:						
Gosport	95	0-6	15-20	---	5.1-7.3	0
		6-22	---	30-50	3.6-5.5	0
		22-80	---	---	---	---
319E:						
Dunbarton	95	0-7	---	---	5.6-7.3	---
		7-16	---	---	6.6-7.8	---
		16-80	---	---	---	---
422:						
Amana	90	0-15	25-30	---	5.6-7.3	0
		15-37	25-30	---	5.1-6.5	0
		37-80	25-30	---	5.6-6.5	0
423D2:						
Bucknell	90	0-6	20-25	---	5.1-7.3	0
		6-53	---	36-41	4.5-6.0	0
		53-80	30-36	---	5.6-7.3	0
424D:						
Lindley	52	0-9	10-16	---	4.5-7.3	0
		9-62	15-20	---	4.5-6.5	0
		62-80	10-16	---	6.1-7.8	0
Keswick	43	0-9	20-25	---	4.5-7.3	---
		9-29	---	30-50	4.5-6.0	---
		29-80	30-36	---	4.5-7.8	0-15
424D2:						
Lindley	52	0-7	10-16	---	4.5-7.3	0
		7-60	15-20	---	4.5-6.5	0
		60-80	10-16	---	6.1-7.8	0
Keswick	43	0-7	25-30	---	4.5-7.3	---
		7-27	---	30-50	4.5-6.0	---
		27-80	30-36	---	4.5-7.8	0-15
424E2:						
Lindley	48	0-7	10-16	---	4.5-7.3	0
		7-59	15-20	---	4.5-6.5	0
		59-80	10-16	---	6.1-7.8	0
Keswick	42	0-7	---	25-30	2.5-7.3	---
		7-25	---	30-50	4.5-6.0	---
		25-80	30-36	---	4.5-7.8	0-15
425D:						
Keswick	90	0-9	20-25	---	4.5-7.3	---
		9-29	---	30-50	4.5-6.0	---
		29-80	30-36	---	4.5-7.8	0-15
425D2:						
Keswick	90	0-7	25-30	---	4.5-7.3	---
		7-27	---	30-50	4.5-6.0	---
		27-80	30-36	---	4.5-7.8	0-15
428B:						
Ely	95	0-24	30-36	---	5.6-7.3	0
		24-47	30-36	---	6.1-7.3	0
		47-80	25-30	---	6.6-8.4	0

Table 20.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate
		In	meq/100 g	meq/100 g	pH	Pct
430:						
Ackmore--------------	90	0-6	25-30	---	5.6-7.3	0
		6-22	25-30	---	5.6-7.3	0
		22-80	25-30	---	5.6-7.8	0
453:						
Tuskeego-------------	95	0-9	20-25	---	5.1-7.3	0
		9-19	20-25	---	5.1-6.5	0
		19-61	30-36	---	5.1-6.5	0
		61-80	20-30	---	5.6-6.5	0
520:						
Coppock--------------	95	0-8	20-25	---	6.1-7.3	0
		8-25	20-25	---	5.6-7.3	0
		25-45	---	20-25	4.5-6.0	0
		45-80	---	20-25	4.5-6.0	0
520B:						
Coppock--------------	95	0-8	20-25	---	6.1-7.3	0
		8-25	20-25	---	5.6-7.3	0
		25-45	---	20-25	4.5-6.0	0
		45-80	---	20-25	4.5-6.0	0
570C:						
Nira-----------------	95	0-11	25-30	---	5.6-7.3	0
		11-40	25-30	---	5.1-6.0	0
		40-80	25-30	---	5.6-6.5	0
570C2:						
Nira-----------------	95	0-8	25-30	---	5.6-7.3	0
		8-37	25-30	---	5.1-6.0	0
		37-80	25-30	---	5.6-6.5	0
571C2:						
Hedrick--------------	89	0-7	20-25	---	5.6-7.3	0
		7-48	20-25	---	5.1-6.5	0
		48-69	20-25	---	5.6-7.8	0
		69-80	41-50	---	5.6-7.8	0
571D2:						
Hedrick--------------	95	0-7	20-25	---	5.6-7.3	0
		7-48	20-25	---	5.1-6.5	0
		48-69	20-25	---	5.6-7.8	0
		69-80	41-50	---	5.6-7.8	0
572C2:						
Inton----------------	90	0-8	20-25	---	5.6-7.3	0
		8-39	20-25	---	5.1-6.5	0
		39-52	20-25	---	5.6-7.8	0
		52-80	41-50	---	5.1-7.8	0
572D2:						
Inton----------------	90	0-7	20-25	---	5.6-7.3	0
		7-35	20-25	---	5.1-6.5	0
		35-48	20-25	---	5.6-7.8	0
		48-80	41-50	---	5.1-7.8	0
587:						
Chequest-------------	90	0-14	25-30	---	5.1-7.3	0
		14-80	25-30	---	5.1-6.0	0

Table 20.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate
		In	meq/100 g	meq/100 g	pH	Pct
587+:						
Chequest	90	0-14	20-25	---	5.1-7.3	0
		14-80	25-30	---	5.1-6.0	0
687B:						
Watkins	90	0-15	20-25	---	5.6-7.3	0
		15-65	20-25	---	5.1-6.5	0
		65-80	20-25	---	5.6-6.5	0
688:						
Koszta	90	0-15	20-25	---	5.1-7.3	0
		15-80	20-25	---	5.1-7.3	0
722:						
Nodaway	36	0-9	20-25	---	6.1-7.3	0
		9-80	20-25	---	6.1-7.3	0
Ackmore	32	0-6	25-30	---	5.6-7.3	0
		6-22	25-30	---	5.6-7.3	0
		22-80	25-30	---	5.6-7.8	0
Vesser	22	0-13	25-30	---	5.6-7.3	0
		13-31	20-25	---	5.1-6.0	0
		31-80	25-30	---	5.1-6.5	0
730B:						
Nodaway	46	0-9	20-25	---	6.1-7.3	0
		9-80	20-25	---	6.1-7.3	0
Coppock	27	0-8	20-25	---	6.1-7.3	0
		8-25	20-25	---	5.6-7.3	0
		25-45	---	20-25	4.5-6.0	0
		45-80	---	20-25	4.5-6.0	0
Cantril	17	0-19	15-20	---	5.1-7.3	0
		19-80	20-25	---	5.1-6.5	0
779:						
Kalona	95	0-20	41-50	---	5.6-7.3	0
		20-51	36-41	---	5.6-7.3	0
		51-80	20-25	---	6.1-7.8	0-15
792C2:						
Armstrong	90	0-9	30-35	---	5.6-7.3	---
		9-45	41-50	---	4.5-6.5	---
		45-80	30-35	---	5.1-7.8	---
792D2:						
Armstrong	95	0-9	30-35	---	5.6-7.3	---
		9-43	41-50	---	4.5-6.5	---
		43-80	30-35	---	5.1-7.8	---
795C2:						
Ashgrove	95	0-7	30-35	---	4.5-7.3	---
		7-62	41-50	---	4.5-7.3	---
		62-80	10-16	---	6.1-7.8	0
795D2:						
Ashgrove	82	0-7	30-35	---	4.5-7.3	---
		7-60	41-50	---	4.5-7.3	---
		60-80	10-16	---	6.1-7.8	0

Table 20.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate
		In	meq/100 g	meq/100 g	pH	Pct
822D2:						
Lamoni	90	0-6	25-30	---	5.1-7.3	0
		6-61	41-50	---	5.1-6.5	0
		61-80	25-30	---	5.6-7.3	0
876B:						
Ladoga	90	0-14	20-25	---	6.1-7.3	0
		14-54	20-25	---	5.1-6.0	0
		54-80	20-25	---	5.1-6.5	0
876C2:						
Ladoga	90	0-8	25-30	---	6.1-7.3	0
		8-48	25-30	---	5.1-6.0	0
		48-80	20-25	---	5.1-6.5	0
876D2:						
Ladoga	90	0-8	25-30	---	6.1-7.3	0
		8-46	25-30	---	5.1-6.0	0
		46-80	20-25	---	5.1-6.5	0
880B:						
Clinton	95	0-15	15-20	---	5.1-7.3	0
		15-39	---	25-30	4.5-6.0	0
		39-60	20-25	---	6.1-6.5	0
		60-80	---	5.0-25	4.5-6.0	0
880C2:						
Clinton	95	0-8	25-30	---	5.1-7.3	0
		8-30	---	25-30	4.5-6.0	0
		30-53	20-25	---	6.1-6.5	0
		53-80	---	5.0-25	4.5-6.0	0
880D2:						
Clinton	95	0-8	25-30	---	5.1-7.3	0
		8-28	---	25-30	4.5-6.0	0
		28-51	20-25	---	6.1-6.5	0
		51-80	---	5.0-25	4.5-6.0	0
881B:						
Otley	95	0-17	25-30	---	5.1-7.3	0
		17-40	---	25-30	5.1-5.5	0
		40-80	25-30	---	5.6-7.3	0
911B:						
Colo	57	0-38	36-41	---	5.6-7.3	0
		38-44	36-41	---	5.6-7.3	0
		44-80	30-36	---	6.1-7.3	0
Ely	38	0-24	30-36	---	5.6-7.3	0
		24-47	30-36	---	6.1-7.3	0
		47-80	25-30	---	6.6-8.4	0-25
993D2:						
Gara	48	0-9	25-30	---	5.6-7.3	0
		9-67	25-30	---	4.5-6.5	0
		67-80	25-30	---	5.6-8.4	0-25
Armstrong	42	0-9	30-35	---	5.6-7.3	---
		9-43	41-50	---	4.5-6.5	---
		43-80	30-35	---	5.1-7.8	---

Table 20.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate
		In	meq/100 g	meq/100 g	pH	Pct
993E2:						
Gara	48	0-9	25-30	---	5.6-7.3	0
		9-65	25-30	---	4.5-6.5	0
		65-80	25-30	---	5.6-8.4	0-25
Armstrong	42	0-9	30-35	---	5.6-7.3	---
		9-40	41-50	---	4.5-6.5	---
		40-80	30-35	---	5.1-7.8	---
994D2:						
Galland	65	0-6	25-30	---	5.6-7.3	---
		6-47	---	25-35	4.5-6.0	---
		47-80	10-35	---	6.1-6.5	---
Douds	25	0-7	15-20	---	5.1-7.3	0
		7-56	---	15-20	4.5-6.0	0
		56-80	5.0-20	---	5.1-6.0	0
994E2:						
Galland	55	0-6	25-30	---	5.6-7.3	---
		6-54	---	25-35	4.5-6.0	---
		54-80	10-35	---	6.1-6.5	---
Douds	35	0-6	15-20	---	5.1-7.3	0
		6-54	---	15-20	4.5-6.0	0
		54-80	5.0-20	---	5.1-6.0	0
999F:						
Nordness	62	0-7	15-20	---	5.6-7.3	0
		7-11	20-25	---	6.6-7.3	0
		11-14	---	---	---	---
Eleva	23	0-4	5.0-20	---	3.6-7.3	---
		4-17	1.0-7.0	---	3.6-7.3	---
		17-24	---	---	3.6-7.8	---
		24-80	---	---	---	---
999G:						
Nordness	62	0-7	15-20	---	5.6-7.3	0
		7-11	20-25	---	6.6-7.3	0
		11-14	---	---	---	---
Eleva	23	0-4	5.0-20	---	3.6-7.3	---
		4-17	1.0-7.0	---	3.6-7.3	---
		17-24	---	---	3.6-7.8	---
		24-80	---	---	---	---
1075:						
Givin	90	0-12	20-25	---	5.6-7.3	0
		12-42	---	20-25	5.1-5.5	0
		42-80	20-25	---	5.1-6.0	0
1220:						
Nodaway	90	0-9	20-25	---	6.1-7.3	0
		9-80	20-25	---	6.1-7.3	0
1279:						
Taintor	95	0-6	36-41	---	5.6-7.3	0
		6-17	36-41	---	5.6-7.3	0
		17-58	30-36	---	5.6-6.5	0
		58-80	25-30	---	6.1-7.8	0

Table 20.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate
		In	meq/100 g	meq/100 g	pH	Pct
1280:						
Mahaska	95	0-18	30-36	---	5.1-7.3	0
		18-51	---	30-36	4.5-6.0	0
		51-80	25-30	---	5.6-7.3	0
1315:						
Nodaway	57	0-9	20-25	---	6.1-7.3	0
		9-80	20-25	---	6.1-7.3	0
Klum	38	0-8	10-15	---	5.6-7.3	---
		8-20	10-15	---	5.6-7.3	---
		20-80	10-15	---	6.1-7.3	0
5010:						
Pits, sand and gravel.						
5020:						
Pits and Dumps.						
5030:						
Pits, limestone quarries.						
5040:						
Orthents, loamy.						
5048:						
Aquents.						
5060:						
Pits, clay.						
5080:						
Orthents, sanitary landfill.						
6051:						
Vesser	93	0-13	25-30	---	5.6-7.3	0
		13-31	20-25	---	5.1-6.0	0
		31-80	25-30	---	5.1-6.5	0
6054:						
Zook	95	0-9	36-41	---	5.6-7.3	0
		9-51	36-41	---	5.6-7.8	0
		51-80	30-36	---	5.6-7.8	0
6133:						
Colo	90	0-16	36-41	---	5.6-7.3	0
		16-49	36-41	---	5.6-7.3	0
		49-80	30-36	---	6.1-7.3	0
6133+:						
Colo	90	0-14	25-30	---	5.6-7.3	0
		14-59	36-41	---	5.6-7.3	0
		59-80	30-36	---	6.1-7.3	0
6220:						
Nodaway	90	0-9	20-25	---	6.1-7.3	0
		9-80	20-25	---	6.1-7.3	0

Table 20.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Percent of map unit	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate
		In	meq/100 g	meq/100 g	pH	Pct
6315:						
Nodaway	57	0-9	20-25	---	6.1-7.3	0
		9-80	20-25	---	6.1-7.3	0
Klum	38	0-8	10-15	---	5.6-7.3	---
		8-20	10-15	---	5.6-7.3	---
		20-80	10-15	---	6.1-7.3	0
6422:						
Amana	89	0-15	25-30	---	5.6-7.3	0
		15-37	25-30	---	5.1-6.5	0
		37-80	25-30	---	5.6-6.5	0
6587:						
Chequest	90	0-14	25-30	---	5.1-7.3	0
		14-80	25-30	---	5.1-6.0	0
AW:						
Animal waste.						
SL:						
Sewage lagoon.						
W:						
Water.						

Table 21.--Water Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Hydrologic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
8B:									
Judson	B								
		Jan-Dec	---	---	---	---	None	---	None
8C:									
Judson	B								
		Jan-Dec	---	---	---	---	None	---	None
13B:									
Olmitz	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None
Vesser	C								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	Brief	Rare
		March	1.0-3.5	>6.0	---	---	None	Brief	Rare
		April	1.0-3.5	>6.0	---	---	None	Brief	Rare
		May	1.0-3.5	>6.0	---	---	None	Brief	Rare
		June	1.0-3.5	>6.0	---	---	None	Brief	Rare
		July	1.0-3.5	>6.0	---	---	None	Brief	Rare
		August	3.5-6.0	>6.0	---	---	None	Brief	Rare
		September	3.5-6.0	>6.0	---	---	None	Brief	Rare
		October	3.5-6.0	>6.0	---	---	None	Brief	Rare
		November	1.0-3.5	>6.0	---	---	None	Brief	Rare
		December	1.0-3.5	>6.0	---	---	None	---	None
Zook	C/D								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		March	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		April	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		May	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		June	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		July	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		August	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		September	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		October	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		November	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		December	0.0-1.0	>6.0	---	---	None	---	None
24D2:									
Shelby	B								
		Jan-Dec	---	---	---	---	None	---	None
24E2:									
Shelby	B								
		Jan-Dec	---	---	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
51:									
Vesser	C								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		March	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		April	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		May	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		June	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		July	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		August	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		September	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		October	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		November	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		December	0.0-1.0	>6.0	---	---	None	---	None
51B:									
Vesser	C								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	Brief	Rare
		March	1.0-3.5	>6.0	---	---	None	Brief	Rare
		April	1.0-3.5	>6.0	---	---	None	Brief	Rare
		May	1.0-3.5	>6.0	---	---	None	Brief	Rare
		June	1.0-3.5	>6.0	---	---	None	Brief	Rare
		July	1.0-3.5	>6.0	---	---	None	Brief	Rare
		August	3.5-6.0	>6.0	---	---	None	Brief	Rare
		September	3.5-6.0	>6.0	---	---	None	Brief	Rare
		October	3.5-6.0	>6.0	---	---	None	Brief	Rare
		November	1.0-3.5	>6.0	---	---	None	Brief	Rare
		December	1.0-3.5	>6.0	---	---	None	---	None
54:									
Zook	C/D								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		March	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		April	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		May	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		June	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		July	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		August	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		September	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		October	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		November	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		December	0.0-1.0	>6.0	---	---	None	Brief	None
54+:									
Zook	C/D								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		March	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		April	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		May	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		June	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		July	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		August	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		September	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		October	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		November	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		December	0.0-1.0	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
56B:									
Cantril	B								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None
56C:									
Cantril	B								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None
65D2:									
Lindley	C								
		Jan-Dec	---	---	---	---	None	---	None
65E:									
Lindley	C								
		Jan-Dec	---	---	---	---	None	---	None
65E2:									
Lindley	C								
		Jan-Dec	---	---	---	---	None	---	None
65F:									
Lindley	C								
		Jan-Dec	---	---	---	---	None	---	None
65F2:									
Lindley	C								
		Jan-Dec	---	---	---	---	None	---	None
65G:									
Lindley	C								
		Jan-Dec	---	---	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
74:									
Rubio	C/D								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	---	None
		March	0.0-1.0	>6.0	---	---	None	---	None
		April	0.0-1.0	>6.0	---	---	None	---	None
		May	0.0-1.0	>6.0	---	---	None	---	None
		June	0.0-1.0	>6.0	---	---	None	---	None
		July	0.0-1.0	>6.0	---	---	None	---	None
		August	0.0-6.0	>6.0	---	---	None	---	None
		September	0.0-6.0	>6.0	---	---	None	---	None
		October	0.0-6.0	>6.0	---	---	None	---	None
		November	0.0-1.0	>6.0	---	---	None	---	None
		December	0.0-1.0	>6.0	---	---	None	---	None
75:									
Givin	C								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None
75B:									
Givin	C								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None
76B:									
Ladoga	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
76B2:									
Ladoga--------------------	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None
76C:									
Ladoga--------------------	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None
76C2:									
Ladoga--------------------	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None
76D2:									
Ladoga--------------------	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
80B:									
Clinton	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None
80C:									
Clinton	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None
80C2:									
Clinton	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None
80D:									
Clinton	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
80D2:									
Clinton	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None
87B:									
Colo	B								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		March	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		April	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		May	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		June	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		July	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		August	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		September	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		October	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		November	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		December	0.0-1.0	>6.0	---	---	None	---	None
Zook	C/D								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		March	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		April	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		May	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		June	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		July	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		August	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		September	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		October	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		November	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		December	0.0-1.0	>6.0	---	---	None	---	None
93D2:									
Shelby	B								
		Jan-Dec	---	---	---	---	None	---	None
Adair	C								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
122:									
Sperry	C/D								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	0.0-1.0	Long	Frequent	---	None
		March	0.0-1.0	>6.0	0.0-1.0	Long	Frequent	---	None
		April	0.0-1.0	>6.0	0.0-1.0	Long	Frequent	---	None
		May	0.0-1.0	>6.0	0.0-1.0	Long	Frequent	---	None
		June	0.0-1.0	>6.0	0.0-1.0	Long	Frequent	---	None
		July	0.0-1.0	>6.0	0.0-1.0	Long	Frequent	---	None
		August	0.0-6.0	>6.0	---	---	None	---	None
		September	0.0-6.0	>6.0	---	---	None	---	None
		October	0.0-6.0	>6.0	---	---	None	---	None
		November	0.0-1.0	>6.0	0.0-1.0	Long	Frequent	---	None
		December	0.0-1.0	>6.0	---	---	None	---	None
133:									
Colo	B/D								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		March	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		April	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		May	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		June	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		July	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		August	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		September	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		October	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		November	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		December	0.0-1.0	>6.0	---	---	None	---	None
133+:									
Colo	B/D								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		March	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		April	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		May	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		June	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		July	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		August	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		September	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		October	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		November	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		December	0.0-1.0	>6.0	---	---	None	---	None
133B:									
Colo	B/D								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	Brief	Rare
		March	0.0-1.0	>6.0	---	---	None	Brief	Rare
		April	0.0-1.0	>6.0	---	---	None	Brief	Rare
		May	0.0-1.0	>6.0	---	---	None	Brief	Rare
		June	0.0-1.0	>6.0	---	---	None	Brief	Rare
		July	0.0-1.0	>6.0	---	---	None	Brief	Rare
		August	0.0-6.0	>6.0	---	---	None	Brief	Rare
		September	0.0-6.0	>6.0	---	---	None	Brief	Rare
		October	0.0-6.0	>6.0	---	---	None	Brief	Rare
		November	0.0-1.0	>6.0	---	---	None	Brief	Rare
		December	0.0-1.0	>6.0	---	---	None	---	None
163E:									
Fayette	B								
		Jan-Dec	---	---	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table Upper limit	Water table Lower limit	Ponding Surface water depth	Ponding Duration	Ponding Frequency	Flooding Duration	Flooding Frequency
			Ft	Ft	Ft				
163E2:									
Fayette	B								
		Jan-Dec	---	---	---	---	None	---	None
163F:									
Fayette	B								
		Jan-Dec	---	---	---	---	None	---	None
179D2:									
Gara	C								
		Jan-Dec	---	---	---	---	None	---	None
179E:									
Gara	C								
		Jan-Dec	---	---	---	---	None	---	None
179E2:									
Gara	C								
		Jan-Dec	---	---	---	---	None	---	None
179F2:									
Gara	C								
		Jan-Dec	---	---	---	---	None	---	None
180:									
Keomah	C								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None
220:									
Nodaway	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	Brief	Occasional
		March	4.0-6.0	>6.0	---	---	None	Brief	Occasional
		April	4.0-6.0	>6.0	---	---	None	Brief	Occasional
		May	4.0-6.0	>6.0	---	---	None	Brief	Occasional
		June	4.0-6.0	>6.0	---	---	None	Brief	Occasional
		July	4.0-6.0	>6.0	---	---	None	Brief	Occasional
		August	>6.0	>6.0	---	---	None	Brief	Occasional
		September	>6.0	>6.0	---	---	None	Brief	Occasional
		October	>6.0	>6.0	---	---	None	Brief	Occasional
		November	4.0-6.0	>6.0	---	---	None	Brief	Occasional
		December	4.0-6.0	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
222C:									
Clarinda	D								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	---	None
		March	0.0-1.0	>6.0	---	---	None	---	None
		April	0.0-1.0	>6.0	---	---	None	---	None
		May	0.0-1.0	>6.0	---	---	None	---	None
		June	0.0-1.0	>6.0	---	---	None	---	None
		July	0.0-1.0	>6.0	---	---	None	---	None
		August	0.0-6.0	>6.0	---	---	None	---	None
		September	0.0-6.0	>6.0	---	---	None	---	None
		October	0.0-6.0	>6.0	---	---	None	---	None
		November	0.0-1.0	>6.0	---	---	None	---	None
		December	0.0-1.0	>6.0	---	---	None	---	None
222C2:									
Clarinda	D								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	---	None
		March	0.0-1.0	>6.0	---	---	None	---	None
		April	0.0-1.0	>6.0	---	---	None	---	None
		May	0.0-1.0	>6.0	---	---	None	---	None
		June	0.0-1.0	>6.0	---	---	None	---	None
		July	0.0-1.0	>6.0	---	---	None	---	None
		August	0.0-6.0	>6.0	---	---	None	---	None
		September	0.0-6.0	>6.0	---	---	None	---	None
		October	0.0-6.0	>6.0	---	---	None	---	None
		November	0.0-1.0	>6.0	---	---	None	---	None
		December	0.0-1.0	>6.0	---	---	None	---	None
223C2:									
Rinda	D								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	---	None
		March	0.0-1.0	>6.0	---	---	None	---	None
		April	0.0-1.0	>6.0	---	---	None	---	None
		May	0.0-1.0	>6.0	---	---	None	---	None
		June	0.0-1.0	>6.0	---	---	None	---	None
		July	0.0-1.0	>6.0	---	---	None	---	None
		August	0.0-6.0	>6.0	---	---	None	---	None
		September	0.0-6.0	>6.0	---	---	None	---	None
		October	0.0-6.0	>6.0	---	---	None	---	None
		November	0.0-1.0	>6.0	---	---	None	---	None
		December	0.0-1.0	>6.0	---	---	None	---	None
273C:									
Olmitz	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
279:									
Taintor	C/D								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	---	None
		March	0.0-1.0	>6.0	---	---	None	---	None
		April	0.0-1.0	>6.0	---	---	None	---	None
		May	0.0-1.0	>6.0	---	---	None	---	None
		June	0.0-1.0	>6.0	---	---	None	---	None
		July	0.0-1.0	>6.0	---	---	None	---	None
		August	0.0-6.0	>6.0	---	---	None	---	None
		September	0.0-6.0	>6.0	---	---	None	---	None
		October	0.0-6.0	>6.0	---	---	None	---	None
		November	0.0-1.0	>6.0	---	---	None	---	None
		December	0.0-1.0	>6.0	---	---	None	---	None
280:									
Mahaska	B								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None
280B:									
Mahaska	B								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None
281B:									
Otley	B								
		January	2.0-4.0	>6.0	---	---	None	---	None
		February	2.0-4.0	>6.0	---	---	None	---	None
		March	2.0-4.0	>6.0	---	---	None	---	None
		April	2.0-4.0	>6.0	---	---	None	---	None
		May	2.0-4.0	>6.0	---	---	None	---	None
		June	2.0-4.0	>6.0	---	---	None	---	None
		July	2.0-4.0	>6.0	---	---	None	---	None
		August	4.0-6.0	>6.0	---	---	None	---	None
		September	4.0-6.0	>6.0	---	---	None	---	None
		October	4.0-6.0	>6.0	---	---	None	---	None
		November	2.0-4.0	>6.0	---	---	None	---	None
		December	2.0-4.0	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
281B2:									
Otley	B								
		January	2.0-4.0	>6.0	---	---	None	---	None
		February	2.0-4.0	>6.0	---	---	None	---	None
		March	2.0-4.0	>6.0	---	---	None	---	None
		April	2.0-4.0	>6.0	---	---	None	---	None
		May	2.0-4.0	>6.0	---	---	None	---	None
		June	2.0-4.0	>6.0	---	---	None	---	None
		July	2.0-4.0	>6.0	---	---	None	---	None
		August	4.0-6.0	>6.0	---	---	None	---	None
		September	4.0-6.0	>6.0	---	---	None	---	None
		October	4.0-6.0	>6.0	---	---	None	---	None
		November	2.0-4.0	>6.0	---	---	None	---	None
		December	2.0-4.0	>6.0	---	---	None	---	None
281C:									
Otley	B								
		January	2.0-4.0	>6.0	---	---	None	---	None
		February	2.0-4.0	>6.0	---	---	None	---	None
		March	2.0-4.0	>6.0	---	---	None	---	None
		April	2.0-4.0	>6.0	---	---	None	---	None
		May	2.0-4.0	>6.0	---	---	None	---	None
		June	2.0-4.0	>6.0	---	---	None	---	None
		July	2.0-4.0	>6.0	---	---	None	---	None
		August	4.0-6.0	>6.0	---	---	None	---	None
		September	4.0-6.0	>6.0	---	---	None	---	None
		October	4.0-6.0	>6.0	---	---	None	---	None
		November	2.0-4.0	>6.0	---	---	None	---	None
		December	2.0-4.0	>6.0	---	---	None	---	None
281C2:									
Otley	B								
		January	2.0-4.0	>6.0	---	---	None	---	None
		February	2.0-4.0	>6.0	---	---	None	---	None
		March	2.0-4.0	>6.0	---	---	None	---	None
		April	2.0-4.0	>6.0	---	---	None	---	None
		May	2.0-4.0	>6.0	---	---	None	---	None
		June	2.0-4.0	>6.0	---	---	None	---	None
		July	2.0-4.0	>6.0	---	---	None	---	None
		August	4.0-6.0	>6.0	---	---	None	---	None
		September	4.0-6.0	>6.0	---	---	None	---	None
		October	4.0-6.0	>6.0	---	---	None	---	None
		November	2.0-4.0	>6.0	---	---	None	---	None
		December	2.0-4.0	>6.0	---	---	None	---	None
281D2:									
Otley	B								
		January	2.0-4.0	>6.0	---	---	None	---	None
		February	2.0-4.0	>6.0	---	---	None	---	None
		March	2.0-4.0	>6.0	---	---	None	---	None
		April	2.0-4.0	>6.0	---	---	None	---	None
		May	2.0-4.0	>6.0	---	---	None	---	None
		June	2.0-4.0	>6.0	---	---	None	---	None
		July	2.0-4.0	>6.0	---	---	None	---	None
		August	4.0-6.0	>6.0	---	---	None	---	None
		September	4.0-6.0	>6.0	---	---	None	---	None
		October	4.0-6.0	>6.0	---	---	None	---	None
		November	2.0-4.0	>6.0	---	---	None	---	None
		December	2.0-4.0	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
293C:									
Chelsea	A								
		Jan-Dec	---	---	---	---	None	---	None
Fayette	B								
		Jan-Dec	---	---	---	---	None	---	None
293D:									
Chelsea	A								
		Jan-Dec	---	---	---	---	None	---	None
Fayette	B								
		Jan-Dec	---	---	---	---	None	---	None
293E:									
Chelsea	A								
		Jan-Dec	---	---	---	---	None	---	None
Fayette	B								
		Jan-Dec	---	---	---	---	None	---	None
293F:									
Chelsea	A								
		Jan-Dec	---	---	---	---	None	---	None
Fayette	B								
		Jan-Dec	---	---	---	---	None	---	None
294C:									
Billett	B								
		Jan-Dec	---	---	---	---	None	---	None
Ladoga	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None
294D:									
Billett	B								
		Jan-Dec	---	---	---	---	None	---	None
Ladoga	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
313F2:									
Gosport	C								
		January	2.0-4.0	>6.0	---	---	None	---	None
		February	2.0-4.0	>6.0	---	---	None	---	None
		March	2.0-4.0	>6.0	---	---	None	---	None
		April	2.0-4.0	>6.0	---	---	None	---	None
		May	2.0-4.0	>6.0	---	---	None	---	None
		June	2.0-4.0	>6.0	---	---	None	---	None
		July	2.0-4.0	>6.0	---	---	None	---	None
		August	4.0-6.0	>6.0	---	---	None	---	None
		September	4.0-6.0	>6.0	---	---	None	---	None
		October	4.0-6.0	>6.0	---	---	None	---	None
		November	2.0-4.0	>6.0	---	---	None	---	None
		December	2.0-4.0	>6.0	---	---	None	---	None
319E:									
Dunbarton	D								
		Jan-Dec	---	---	---	---	None	---	None
422:									
Amana	B								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	Brief	Occasional
		March	1.0-3.5	>6.0	---	---	None	Brief	Occasional
		April	1.0-3.5	>6.0	---	---	None	Brief	Occasional
		May	1.0-3.5	>6.0	---	---	None	Brief	Occasional
		June	1.0-3.5	>6.0	---	---	None	Brief	Occasional
		July	1.0-3.5	>6.0	---	---	None	Brief	Occasional
		August	3.5-6.0	>6.0	---	---	None	Brief	Occasional
		September	3.5-6.0	>6.0	---	---	None	Brief	Occasional
		October	3.5-6.0	>6.0	---	---	None	Brief	Occasional
		November	1.0-3.5	>6.0	---	---	None	Brief	Occasional
		December	1.0-3.5	>6.0	---	---	None	---	None
423D2:									
Bucknell	D								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None
424D:									
Lindley	C								
		Jan-Dec	---	---	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
424D:									
Keswick	C								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None
424D2:									
Lindley	C								
		Jan-Dec	---	---	---	---	None	---	None
Keswick	C								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None
424E2:									
Lindley	C								
		Jan-Dec	---	---	---	---	None	---	None
Keswick	C								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
425D:									
Keswick-------------------	C								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None
425D2:									
Keswick-------------------	C								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None
428B:									
Ely-----------------------	B								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None
430:									
Ackmore-------------------	B								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	Brief	Occasional
		March	1.0-3.5	>6.0	---	---	None	Brief	Occasional
		April	1.0-3.5	>6.0	---	---	None	Brief	Occasional
		May	1.0-3.5	>6.0	---	---	None	Brief	Occasional
		June	1.0-3.5	>6.0	---	---	None	Brief	Occasional
		July	1.0-3.5	>6.0	---	---	None	Brief	Occasional
		August	3.5-6.0	>6.0	---	---	None	Brief	Occasional
		September	3.5-6.0	>6.0	---	---	None	Brief	Occasional
		October	3.5-6.0	>6.0	---	---	None	Brief	Occasional
		November	1.0-3.5	>6.0	---	---	None	Brief	Occasional
		December	1.0-3.5	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
453:									
Tuskeego	C/D								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		March	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		April	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		May	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		June	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		July	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		August	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		September	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		October	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		November	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		December	0.0-1.0	>6.0	---	---	None	---	None
520:									
Coppock	B								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		March	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		April	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		May	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		June	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		July	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		August	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		September	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		October	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		November	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		December	0.0-1.0	>6.0	---	---	None	---	None
520B:									
Coppock	B								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	Brief	Rare
		March	1.0-3.5	>6.0	---	---	None	Brief	Rare
		April	1.0-3.5	>6.0	---	---	None	Brief	Rare
		May	1.0-3.5	>6.0	---	---	None	Brief	Rare
		June	1.0-3.5	>6.0	---	---	None	Brief	Rare
		July	1.0-3.5	>6.0	---	---	None	Brief	Rare
		August	3.5-6.0	>6.0	---	---	None	Brief	Rare
		September	3.5-6.0	>6.0	---	---	None	Brief	Rare
		October	3.5-6.0	>6.0	---	---	None	Brief	Rare
		November	1.0-3.5	>6.0	---	---	None	Brief	Rare
		December	1.0-3.5	>6.0	---	---	None	---	None
570C:									
Nira	B								
		January	2.0-4.0	>6.0	---	---	None	---	None
		February	2.0-4.0	>6.0	---	---	None	---	None
		March	2.0-4.0	>6.0	---	---	None	---	None
		April	2.0-4.0	>6.0	---	---	None	---	None
		May	2.0-4.0	>6.0	---	---	None	---	None
		June	2.0-4.0	>6.0	---	---	None	---	None
		July	2.0-4.0	>6.0	---	---	None	---	None
		August	4.0-6.0	>6.0	---	---	None	---	None
		September	4.0-6.0	>6.0	---	---	None	---	None
		October	4.0-6.0	>6.0	---	---	None	---	None
		November	2.0-4.0	>6.0	---	---	None	---	None
		December	2.0-4.0	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
570C2:									
Nira	B								
		January	2.0-4.0	>6.0	---	---	None	---	None
		February	2.0-4.0	>6.0	---	---	None	---	None
		March	2.0-4.0	>6.0	---	---	None	---	None
		April	2.0-4.0	>6.0	---	---	None	---	None
		May	2.0-4.0	>6.0	---	---	None	---	None
		June	2.0-4.0	>6.0	---	---	None	---	None
		July	2.0-4.0	>6.0	---	---	None	---	None
		August	4.0-6.0	>6.0	---	---	None	---	None
		September	4.0-6.0	>6.0	---	---	None	---	None
		October	4.0-6.0	>6.0	---	---	None	---	None
		November	2.0-4.0	>6.0	---	---	None	---	None
		December	2.0-4.0	>6.0	---	---	None	---	None
571C2:									
Hedrick	B								
		January	2.0-4.0	>6.0	---	---	None	---	None
		February	2.0-4.0	>6.0	---	---	None	---	None
		March	2.0-4.0	>6.0	---	---	None	---	None
		April	2.0-4.0	>6.0	---	---	None	---	None
		May	2.0-4.0	>6.0	---	---	None	---	None
		June	2.0-4.0	>6.0	---	---	None	---	None
		July	2.0-4.0	>6.0	---	---	None	---	None
		August	4.0-6.0	>6.0	---	---	None	---	None
		September	4.0-6.0	>6.0	---	---	None	---	None
		October	4.0-6.0	>6.0	---	---	None	---	None
		November	2.0-4.0	>6.0	---	---	None	---	None
		December	2.0-4.0	>6.0	---	---	None	---	None
571D2:									
Hedrick	B								
		January	2.0-4.0	>6.0	---	---	None	---	None
		February	2.0-4.0	>6.0	---	---	None	---	None
		March	2.0-4.0	>6.0	---	---	None	---	None
		April	2.0-4.0	>6.0	---	---	None	---	None
		May	2.0-4.0	>6.0	---	---	None	---	None
		June	2.0-4.0	>6.0	---	---	None	---	None
		July	2.0-4.0	>6.0	---	---	None	---	None
		August	4.0-6.0	>6.0	---	---	None	---	None
		September	4.0-6.0	>6.0	---	---	None	---	None
		October	4.0-6.0	>6.0	---	---	None	---	None
		November	2.0-4.0	>6.0	---	---	None	---	None
		December	2.0-4.0	>6.0	---	---	None	---	None
572C2:									
Inton	B								
		January	2.0-4.0	>6.0	---	---	None	---	None
		February	2.0-4.0	>6.0	---	---	None	---	None
		March	2.0-4.0	>6.0	---	---	None	---	None
		April	2.0-4.0	>6.0	---	---	None	---	None
		May	2.0-4.0	>6.0	---	---	None	---	None
		June	2.0-4.0	>6.0	---	---	None	---	None
		July	2.0-4.0	>6.0	---	---	None	---	None
		August	4.0-6.0	>6.0	---	---	None	---	None
		September	4.0-6.0	>6.0	---	---	None	---	None
		October	4.0-6.0	>6.0	---	---	None	---	None
		November	2.0-4.0	>6.0	---	---	None	---	None
		December	2.0-4.0	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
572D2:									
Inton	B								
		January	2.0-4.0	>6.0	---	---	None	---	None
		February	2.0-4.0	>6.0	---	---	None	---	None
		March	2.0-4.0	>6.0	---	---	None	---	None
		April	2.0-4.0	>6.0	---	---	None	---	None
		May	2.0-4.0	>6.0	---	---	None	---	None
		June	2.0-4.0	>6.0	---	---	None	---	None
		July	2.0-4.0	>6.0	---	---	None	---	None
		August	4.0-6.0	>6.0	---	---	None	---	None
		September	4.0-6.0	>6.0	---	---	None	---	None
		October	4.0-6.0	>6.0	---	---	None	---	None
		November	2.0-4.0	>6.0	---	---	None	---	None
		December	2.0-4.0	>6.0	---	---	None	---	None
587:									
Chequest	C								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		March	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		April	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		May	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		June	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		July	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		August	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		September	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		October	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		November	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		December	0.0-1.0	>6.0	---	---	None	---	None
587+:									
Chequest	C								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		March	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		April	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		May	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		June	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		July	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		August	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		September	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		October	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		November	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		December	0.0-1.0	>6.0	---	---	None	---	None
687B:									
Watkins	B								
		Jan-Dec	---	---	---	---	None	---	None
688:									
Koszta	B								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
722:									
Nodaway	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	Brief	Occasional
		March	4.0-6.0	>6.0	---	---	None	Brief	Occasional
		April	4.0-6.0	>6.0	---	---	None	Brief	Occasional
		May	4.0-6.0	>6.0	---	---	None	Brief	Occasional
		June	4.0-6.0	>6.0	---	---	None	Brief	Occasional
		July	4.0-6.0	>6.0	---	---	None	Brief	Occasional
		August	>6.0	>6.0	---	---	None	Brief	Occasional
		September	>6.0	>6.0	---	---	None	Brief	Occasional
		October	>6.0	>6.0	---	---	None	Brief	Occasional
		November	4.0-6.0	>6.0	---	---	None	Brief	Occasional
		December	4.0-6.0	>6.0	---	---	None	---	None
Ackmore	B								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	Brief	Occasional
		March	1.0-3.5	>6.0	---	---	None	Brief	Occasional
		April	1.0-3.5	>6.0	---	---	None	Brief	Occasional
		May	1.0-3.5	>6.0	---	---	None	Brief	Occasional
		June	1.0-3.5	>6.0	---	---	None	Brief	Occasional
		July	1.0-3.5	>6.0	---	---	None	Brief	Occasional
		August	3.5-6.0	>6.0	---	---	None	Brief	Occasional
		September	3.5-6.0	>6.0	---	---	None	Brief	Occasional
		October	3.5-6.0	>6.0	---	---	None	Brief	Occasional
		November	1.0-3.5	>6.0	---	---	None	Brief	Occasional
		December	1.0-3.5	>6.0	---	---	None	---	None
Vesser	C								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		March	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		April	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		May	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		June	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		July	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		August	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		September	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		October	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		November	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		December	0.0-1.0	>6.0	---	---	None	---	None
730B:									
Nodaway	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	Brief	Occasional
		March	4.0-6.0	>6.0	---	---	None	Brief	Occasional
		April	4.0-6.0	>6.0	---	---	None	Brief	Occasional
		May	4.0-6.0	>6.0	---	---	None	Brief	Occasional
		June	4.0-6.0	>6.0	---	---	None	Brief	Occasional
		July	4.0-6.0	>6.0	---	---	None	Brief	Occasional
		August	>6.0	>6.0	---	---	None	Brief	Occasional
		September	>6.0	>6.0	---	---	None	Brief	Occasional
		October	>6.0	>6.0	---	---	None	Brief	Occasional
		November	4.0-6.0	>6.0	---	---	None	Brief	Occasional
		December	4.0-6.0	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
730B:									
Coppock	B								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	Brief	Rare
		March	1.0-3.5	>6.0	---	---	None	Brief	Rare
		April	1.0-3.5	>6.0	---	---	None	Brief	Rare
		May	1.0-3.5	>6.0	---	---	None	Brief	Rare
		June	1.0-3.5	>6.0	---	---	None	Brief	Rare
		July	1.0-3.5	>6.0	---	---	None	Brief	Rare
		August	3.5-6.0	>6.0	---	---	None	Brief	Rare
		September	3.5-6.0	>6.0	---	---	None	Brief	Rare
		October	3.5-6.0	>6.0	---	---	None	Brief	Rare
		November	1.0-3.5	>6.0	---	---	None	Brief	Rare
		December	1.0-3.5	>6.0	---	---	None	---	None
Cantril	B								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	Brief	Rare
		March	1.0-3.5	>6.0	---	---	None	Brief	Rare
		April	1.0-3.5	>6.0	---	---	None	Brief	Rare
		May	1.0-3.5	>6.0	---	---	None	Brief	Rare
		June	1.0-3.5	>6.0	---	---	None	Brief	Rare
		July	1.0-3.5	>6.0	---	---	None	Brief	Rare
		August	3.5-6.0	>6.0	---	---	None	Brief	Rare
		September	3.5-6.0	>6.0	---	---	None	Brief	Rare
		October	3.5-6.0	>6.0	---	---	None	Brief	Rare
		November	1.0-3.5	>6.0	---	---	None	Brief	Rare
		December	1.0-3.5	>6.0	---	---	None	---	None
779:									
Kalona	C								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	---	None
		March	0.0-1.0	>6.0	---	---	None	---	None
		April	0.0-1.0	>6.0	---	---	None	---	None
		May	0.0-1.0	>6.0	---	---	None	---	None
		June	0.0-1.0	>6.0	---	---	None	---	None
		July	0.0-1.0	>6.0	---	---	None	---	None
		August	0.0-6.0	>6.0	---	---	None	---	None
		September	0.0-6.0	>6.0	---	---	None	---	None
		October	0.0-6.0	>6.0	---	---	None	---	None
		November	0.0-1.0	>6.0	---	---	None	---	None
		December	0.0-1.0	>6.0	---	---	None	---	None
792C2:									
Armstrong	C								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
792D2:									
Armstrong	C								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None
795C2:									
Ashgrove	D								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	---	None
		March	0.0-1.0	>6.0	---	---	None	---	None
		April	0.0-1.0	>6.0	---	---	None	---	None
		May	0.0-1.0	>6.0	---	---	None	---	None
		June	0.0-1.0	>6.0	---	---	None	---	None
		July	0.0-1.0	>6.0	---	---	None	---	None
		August	0.0-6.0	>6.0	---	---	None	---	None
		September	0.0-6.0	>6.0	---	---	None	---	None
		October	0.0-6.0	>6.0	---	---	None	---	None
		November	0.0-1.0	>6.0	---	---	None	---	None
		December	0.0-1.0	>6.0	---	---	None	---	None
795D2:									
Ashgrove	D								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	---	None
		March	0.0-1.0	>6.0	---	---	None	---	None
		April	0.0-1.0	>6.0	---	---	None	---	None
		May	0.0-1.0	>6.0	---	---	None	---	None
		June	0.0-1.0	>6.0	---	---	None	---	None
		July	0.0-1.0	>6.0	---	---	None	---	None
		August	0.0-6.0	>6.0	---	---	None	---	None
		September	0.0-6.0	>6.0	---	---	None	---	None
		October	0.0-6.0	>6.0	---	---	None	---	None
		November	0.0-1.0	>6.0	---	---	None	---	None
		December	0.0-1.0	>6.0	---	---	None	---	None
822D2:									
Lamoni	C								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table Upper limit	Water table Lower limit	Ponding Surface water depth	Ponding Duration	Ponding Frequency	Flooding Duration	Flooding Frequency
			Ft	Ft	Ft				
876B:									
Ladoga	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None
876C2:									
Ladoga	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None
876D2:									
Ladoga	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None
880B:									
Clinton	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
880C2:									
Clinton	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None
880D2:									
Clinton	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None
881B:									
Otley	B								
		January	2.0-4.0	>6.0	---	---	None	---	None
		February	2.0-4.0	>6.0	---	---	None	---	None
		March	2.0-4.0	>6.0	---	---	None	---	None
		April	2.0-4.0	>6.0	---	---	None	---	None
		May	2.0-4.0	>6.0	---	---	None	---	None
		June	2.0-4.0	>6.0	---	---	None	---	None
		July	2.0-4.0	>6.0	---	---	None	---	None
		August	4.0-6.0	>6.0	---	---	None	---	None
		September	4.0-6.0	>6.0	---	---	None	---	None
		October	4.0-6.0	>6.0	---	---	None	---	None
		November	2.0-4.0	>6.0	---	---	None	---	None
		December	2.0-4.0	>6.0	---	---	None	---	None
911B:									
Colo	B								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		March	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		April	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		May	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		June	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		July	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		August	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		September	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		October	0.0-6.0	>6.0	---	---	None	Brief	Occasional
		November	0.0-1.0	>6.0	---	---	None	Brief	Occasional
		December	0.0-1.0	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
911B:									
Ely	B								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None
993D2:									
Gara	C								
		Jan-Dec	---	---	---	---	None	---	None
Armstrong	C								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None
993E2:									
Gara	C								
		Jan-Dec	---	---	---	---	None	---	None
Armstrong	C								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
994D2:									
Galland	D								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None
Douds	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None
994E2:									
Galland	D								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None
Douds	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
999F:									
Nordness	B								
		Jan-Dec	---	---	---	---	None	---	None
Eleva	A								
		Jan-Dec	---	---	---	---	None	---	None
999G:									
Nordness	B								
		Jan-Dec	---	---	---	---	None	---	None
Eleva	A								
		Jan-Dec	---	---	---	---	None	---	None
1075:									
Givin	C								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None
1220:									
Nodaway	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		March	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		April	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		May	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		June	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		July	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		August	>6.0	>6.0	---	---	None	Brief	Frequent
		September	>6.0	>6.0	---	---	None	Brief	Frequent
		October	>6.0	>6.0	---	---	None	Brief	Frequent
		November	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		December	4.0-6.0	>6.0	---	---	None	---	None
1279:									
Taintor	C/D								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	---	None
		March	0.0-1.0	>6.0	---	---	None	---	None
		April	0.0-1.0	>6.0	---	---	None	---	None
		May	0.0-1.0	>6.0	---	---	None	---	None
		June	0.0-1.0	>6.0	---	---	None	---	None
		July	0.0-1.0	>6.0	---	---	None	---	None
		August	0.0-6.0	>6.0	---	---	None	---	None
		September	0.0-6.0	>6.0	---	---	None	---	None
		October	0.0-6.0	>6.0	---	---	None	---	None
		November	0.0-1.0	>6.0	---	---	None	---	None
		December	0.0-1.0	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table Upper limit	Water table Lower limit	Ponding Surface water depth	Ponding Duration	Ponding Frequency	Flooding Duration	Flooding Frequency
			Ft	Ft	Ft				
1280:									
Mahaska	B								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	---	None
		March	1.0-3.5	>6.0	---	---	None	---	None
		April	1.0-3.5	>6.0	---	---	None	---	None
		May	1.0-3.5	>6.0	---	---	None	---	None
		June	1.0-3.5	>6.0	---	---	None	---	None
		July	1.0-3.5	>6.0	---	---	None	---	None
		August	3.5-6.0	>6.0	---	---	None	---	None
		September	3.5-6.0	>6.0	---	---	None	---	None
		October	3.5-6.0	>6.0	---	---	None	---	None
		November	1.0-3.5	>6.0	---	---	None	---	None
		December	1.0-3.5	>6.0	---	---	None	---	None
1315:									
Nodaway	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		March	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		April	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		May	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		June	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		July	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		August	>6.0	>6.0	---	---	None	Brief	Frequent
		September	>6.0	>6.0	---	---	None	Brief	Frequent
		October	>6.0	>6.0	---	---	None	Brief	Frequent
		November	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		December	4.0-6.0	>6.0	---	---	None	---	None
Klum	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		March	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		April	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		May	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		June	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		July	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		August	>6.0	>6.0	---	---	None	Brief	Frequent
		September	>6.0	>6.0	---	---	None	Brief	Frequent
		October	>6.0	>6.0	---	---	None	Brief	Frequent
		November	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		December	4.0-6.0	>6.0	---	---	None	---	None
5010:									
Pits, sand and gravel	A								
		Jan-Dec	---	---	---	---	None	---	None
5020:									
Pits and Dumps	A								
		Jan-Dec	---	---	---	---	None	---	None
5030:									
Pits, limestone quarries	A								
		Jan-Dec	---	---	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
5040:									
Orthents, loamy	---								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	---	None
		March	4.0-6.0	>6.0	---	---	None	---	None
		April	4.0-6.0	>6.0	---	---	None	---	None
		May	4.0-6.0	>6.0	---	---	None	---	None
		June	4.0-6.0	>6.0	---	---	None	---	None
		July	4.0-6.0	>6.0	---	---	None	---	None
		August	>6.0	>6.0	---	---	None	---	None
		September	>6.0	>6.0	---	---	None	---	None
		October	>6.0	>6.0	---	---	None	---	None
		November	4.0-6.0	>6.0	---	---	None	---	None
		December	4.0-6.0	>6.0	---	---	None	---	None
5048:									
Aquents	---								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	0.0-1.0	Very long	Frequent	Very long	Frequent
		March	0.0-1.0	>6.0	0.0-1.0	Very long	Frequent	Very long	Frequent
		April	0.0-1.0	>6.0	0.0-1.0	Very long	Frequent	Very long	Frequent
		May	0.0-1.0	>6.0	0.0-1.0	Very long	Frequent	Very long	Frequent
		June	0.0-1.0	>6.0	0.0-1.0	Very long	Frequent	Very long	Frequent
		July	0.0-1.0	>6.0	0.0-1.0	Very long	Frequent	Very long	Frequent
		August	0.0-6.0	>6.0	---	---	None	Very long	Frequent
		September	0.0-6.0	>6.0	---	---	None	Very long	Frequent
		October	0.0-6.0	>6.0	---	---	None	Very long	Frequent
		November	0.0-1.0	>6.0	0.0-1.0	Very long	Frequent	Very long	Frequent
		December	0.0-1.0	>6.0	---	---	None	---	Frequent
5060:									
Pits, clay	---								
		Jan-Dec	---	---	---	---	None	---	None
5080:									
Orthents, sanitary landfill	---								
		Jan-Dec	---	---	---	---	None	---	None
6051:									
Vesser	C								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	Long	Frequent
		March	0.0-1.0	>6.0	---	---	None	Long	Frequent
		April	0.0-1.0	>6.0	---	---	None	Long	Frequent
		May	0.0-1.0	>6.0	---	---	None	Long	Frequent
		June	0.0-1.0	>6.0	---	---	None	Long	Frequent
		July	0.0-1.0	>6.0	---	---	None	Long	Frequent
		August	0.0-6.0	>6.0	---	---	None	Long	Frequent
		September	0.0-6.0	>6.0	---	---	None	Long	Frequent
		October	0.0-6.0	>6.0	---	---	None	Long	Frequent
		November	0.0-1.0	>6.0	---	---	None	Long	Frequent
		December	0.0-1.0	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
6054:									
Zook	C/D								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	Long	Frequent
		March	0.0-1.0	>6.0	---	---	None	Long	Frequent
		April	0.0-1.0	>6.0	---	---	None	Long	Frequent
		May	0.0-1.0	>6.0	---	---	None	Long	Frequent
		June	0.0-1.0	>6.0	---	---	None	Long	Frequent
		July	0.0-1.0	>6.0	---	---	None	Long	Frequent
		August	0.0-6.0	>6.0	---	---	None	Long	Frequent
		September	0.0-6.0	>6.0	---	---	None	Long	Frequent
		October	0.0-6.0	>6.0	---	---	None	Long	Frequent
		November	0.0-1.0	>6.0	---	---	None	Long	Frequent
		December	0.0-1.0	>6.0	---	---	None	---	None
6133:									
Colo	B/D								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	Long	Frequent
		March	0.0-1.0	>6.0	---	---	None	Long	Frequent
		April	0.0-1.0	>6.0	---	---	None	Long	Frequent
		May	0.0-1.0	>6.0	---	---	None	Long	Frequent
		June	0.0-1.0	>6.0	---	---	None	Long	Frequent
		July	0.0-1.0	>6.0	---	---	None	Long	Frequent
		August	0.0-6.0	>6.0	---	---	None	Long	Frequent
		September	0.0-6.0	>6.0	---	---	None	Long	Frequent
		October	0.0-6.0	>6.0	---	---	None	Long	Frequent
		November	0.0-1.0	>6.0	---	---	None	Long	Frequent
		December	0.0-1.0	>6.0	---	---	None	---	None
6133+:									
Colo	B/D								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	Long	Frequent
		March	0.0-1.0	>6.0	---	---	None	Long	Frequent
		April	0.0-1.0	>6.0	---	---	None	Long	Frequent
		May	0.0-1.0	>6.0	---	---	None	Long	Frequent
		June	0.0-1.0	>6.0	---	---	None	Long	Frequent
		July	0.0-1.0	>6.0	---	---	None	Long	Frequent
		August	0.0-6.0	>6.0	---	---	None	Long	Frequent
		September	0.0-6.0	>6.0	---	---	None	Long	Frequent
		October	0.0-6.0	>6.0	---	---	None	Long	Frequent
		November	0.0-1.0	>6.0	---	---	None	Long	Frequent
		December	0.0-1.0	>6.0	---	---	None	---	None
6220:									
Nodaway	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	Long	Frequent
		March	4.0-6.0	>6.0	---	---	None	Long	Frequent
		April	4.0-6.0	>6.0	---	---	None	Long	Frequent
		May	4.0-6.0	>6.0	---	---	None	Long	Frequent
		June	4.0-6.0	>6.0	---	---	None	Long	Frequent
		July	4.0-6.0	>6.0	---	---	None	Long	Frequent
		August	>6.0	>6.0	---	---	None	Long	Frequent
		September	>6.0	>6.0	---	---	None	Long	Frequent
		October	>6.0	>6.0	---	---	None	Long	Frequent
		November	4.0-6.0	>6.0	---	---	None	Long	Frequent
		December	4.0-6.0	>6.0	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
6315:									
Nodaway	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	Long	Frequent
		March	4.0-6.0	>6.0	---	---	None	Long	Frequent
		April	4.0-6.0	>6.0	---	---	None	Long	Frequent
		May	4.0-6.0	>6.0	---	---	None	Long	Frequent
		June	4.0-6.0	>6.0	---	---	None	Long	Frequent
		July	4.0-6.0	>6.0	---	---	None	Long	Frequent
		August	>6.0	>6.0	---	---	None	Long	Frequent
		September	>6.0	>6.0	---	---	None	Long	Frequent
		October	>6.0	>6.0	---	---	None	Long	Frequent
		November	4.0-6.0	>6.0	---	---	None	Long	Frequent
		December	4.0-6.0	>6.0	---	---	None	---	None
Klum	B								
		January	4.0-6.0	>6.0	---	---	None	---	None
		February	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		March	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		April	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		May	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		June	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		July	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		August	>6.0	>6.0	---	---	None	Brief	Frequent
		September	>6.0	>6.0	---	---	None	Brief	Frequent
		October	>6.0	>6.0	---	---	None	Brief	Frequent
		November	4.0-6.0	>6.0	---	---	None	Brief	Frequent
		December	4.0-6.0	>6.0	---	---	None	---	None
6422:									
Amana	B								
		January	1.0-3.5	>6.0	---	---	None	---	None
		February	1.0-3.5	>6.0	---	---	None	Brief	Frequent
		March	1.0-3.5	>6.0	---	---	None	Brief	Frequent
		April	1.0-3.5	>6.0	---	---	None	Brief	Frequent
		May	1.0-3.5	>6.0	---	---	None	Brief	Frequent
		June	1.0-3.5	>6.0	---	---	None	Brief	Frequent
		July	1.0-3.5	>6.0	---	---	None	Brief	Frequent
		August	3.5-6.0	>6.0	---	---	None	Brief	Frequent
		September	3.5-6.0	>6.0	---	---	None	Brief	Frequent
		October	3.5-6.0	>6.0	---	---	None	Brief	Frequent
		November	1.0-3.5	>6.0	---	---	None	Brief	Frequent
		December	1.0-3.5	>6.0	---	---	None	---	None
6587:									
Chequest	C								
		January	0.0-1.0	>6.0	---	---	None	---	None
		February	0.0-1.0	>6.0	---	---	None	Long	Frequent
		March	0.0-1.0	>6.0	---	---	None	Long	Frequent
		April	0.0-1.0	>6.0	---	---	None	Long	Frequent
		May	0.0-1.0	>6.0	---	---	None	Long	Frequent
		June	0.0-1.0	>6.0	---	---	None	Long	Frequent
		July	0.0-1.0	>6.0	---	---	None	Long	Frequent
		August	0.0-6.0	>6.0	---	---	None	Long	Frequent
		September	0.0-6.0	>6.0	---	---	None	Long	Frequent
		October	0.0-6.0	>6.0	---	---	None	Long	Frequent
		November	0.0-1.0	>6.0	---	---	None	Long	Frequent
		December	0.0-1.0	>6.0	---	---	None	---	None
AW:									
Animal waste.									

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
SL:									
Sewage lagoon.									
W:									
Water.									

Table 22.--Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Percent of map unit	Restrictive layer		Potential for frost action	Risk of corrosion	
		Kind	Depth to top		Uncoated steel	Concrete
			In			
8B:						
Judson	95	---	---	High	Moderate	Low
8C:						
Judson	95	---	---	High	Moderate	Low
13B:						
Olmitz	30	---	---	Moderate	Moderate	Moderate
Vesser	28	---	---	High	High	Moderate
Zook	27	---	---	High	High	Moderate
24D2:						
Shelby	95	---	---	Moderate	Moderate	Moderate
24E2:						
Shelby	90	---	---	Moderate	Moderate	Moderate
51:						
Vesser	90	---	---	High	High	Moderate
51B:						
Vesser	95	---	---	High	High	Moderate
54:						
Zook	90	---	---	High	High	Moderate
54+:						
Zook	90	---	---	High	High	Moderate
56B:						
Cantril	90	---	---	High	Moderate	Low
56C:						
Cantril	90	---	---	High	Moderate	Low
65D2:						
Lindley	95	---	---	Moderate	Moderate	Moderate
65E:						
Lindley	95	---	---	Moderate	Moderate	Moderate
65E2:						
Lindley	90	---	---	Moderate	Moderate	Moderate
65F:						
Lindley	90	---	---	Moderate	Moderate	Moderate
65F2:						
Lindley	90	---	---	Moderate	Moderate	Moderate
65G:						
Lindley	95	---	---	Moderate	Moderate	Moderate
74:						
Rubio	95	---	---	High	High	Moderate

Table 22.--Soil Features--Continued

Map symbol and soil name	Percent of map unit	Restrictive layer: Kind	Restrictive layer: Depth to top	Potential for frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
			In			
75:						
Givin	95	---	---	High	High	Moderate
75B:						
Givin	95	---	---	High	High	Moderate
76B:						
Ladoga	95	---	---	Moderate	Moderate	Moderate
76B2:						
Ladoga	90	---	---	Moderate	Moderate	Moderate
76C:						
Ladoga	95	---	---	Moderate	Moderate	Moderate
76C2:						
Ladoga	90	---	---	Moderate	Moderate	Moderate
76D2:						
Ladoga	90	---	---	Moderate	Moderate	Moderate
80B:						
Clinton	95	---	---	Moderate	Moderate	Moderate
80C:						
Clinton	95	---	---	Moderate	Moderate	Moderate
80C2:						
Clinton	90	---	---	Moderate	Moderate	Moderate
80D:						
Clinton	90	---	---	Moderate	Moderate	Moderate
80D2:						
Clinton	90	---	---	Moderate	Moderate	Moderate
87B:						
Colo	68	---	---	High	High	Moderate
Zook	32	---	---	High	High	Moderate
93D2:						
Shelby	60	---	---	Moderate	Moderate	Moderate
Adair	40	---	---	High	High	Moderate
122:						
Sperry	95	---	---	High	High	Moderate
133:						
Colo	95	---	---	High	High	Moderate
133+:						
Colo	90	---	---	High	High	Moderate
133B:						
Colo	90	---	---	High	High	Moderate
163E:						
Fayette	90	---	---	High	Moderate	Moderate
163E2:						
Fayette	90	---	---	High	Moderate	Moderate

Table 22.--Soil Features--Continued

Map symbol and soil name	Percent of map unit	Restrictive layer: Kind	Restrictive layer: Depth to top	Potential for frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
			In			
163F:						
Fayette	90	---	---	High	Moderate	Moderate
179D2:						
Gara	90	---	---	Moderate	Moderate	Moderate
179E:						
Gara	95	---	---	Moderate	Moderate	Moderate
179E2:						
Gara	90	---	---	Moderate	Moderate	Moderate
179F2:						
Gara	95	---	---	Moderate	Moderate	Moderate
180:						
Keomah	95	---	---	High	High	Moderate
220:						
Nodaway	90	---	---	High	Moderate	Low
222C:						
Clarinda	90	---	---	High	High	Moderate
222C2:						
Clarinda	90	---	---	High	High	Moderate
223C2:						
Rinda	90	---	---	High	High	Moderate
273C:						
Olmitz	95	---	---	Moderate	Moderate	Moderate
279:						
Taintor	95	---	---	High	High	Moderate
280:						
Mahaska	95	---	---	High	High	Moderate
280B:						
Mahaska	90	---	---	High	High	Moderate
281B:						
Otley	90	---	---	Moderate	Moderate	Moderate
281B2:						
Otley	90	---	---	Moderate	Moderate	Moderate
281C:						
Otley	95	---	---	Moderate	Moderate	Moderate
281C2:						
Otley	90	---	---	Moderate	Moderate	Moderate
281D2:						
Otley	90	---	---	Moderate	Moderate	Moderate
293C:						
Chelsea	57	---	---	Low	Low	Low
Fayette	38	---	---	High	Moderate	Moderate

Table 22.--Soil Features--Continued

Map symbol and soil name	Percent of map unit	Restrictive layer: Kind	Restrictive layer: Depth to top	Potential for frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
			In			
293D:						
Chelsea	57	---	---	Low	Low	Low
Fayette	38	---	---	High	Moderate	Moderate
293E:						
Chelsea	57	---	---	Low	Low	Low
Fayette	38	---	---	High	Moderate	Moderate
293F:						
Chelsea	57	---	---	Low	Low	Low
Fayette	38	---	---	High	Moderate	Moderate
294C:						
Billett	65	---	---	Moderate	Low	Moderate
Ladoga	35	---	---	Moderate	Moderate	Moderate
294D:						
Billett	65	---	---	Moderate	Low	Moderate
Ladoga	35	---	---	Moderate	Moderate	Moderate
313F2:						
Gosport	95	Bedrock (paralithic)	20-40	Moderate	High	High
319E:						
Dunbarton	95	Bedrock (lithic)	12-20	Moderate	Moderate	Low
422:						
Amana	90	---	---	High	High	Moderate
423D2:						
Bucknell	90	---	---	High	High	Moderate
424D:						
Lindley	52	---	---	Moderate	Moderate	Moderate
Keswick	43	---	---	High	High	Moderate
424D2:						
Lindley	52	---	---	Moderate	Moderate	Moderate
Keswick	43	---	---	High	High	Moderate
424E2:						
Lindley	48	---	---	Moderate	Moderate	Moderate
Keswick	42	---	---	High	High	Moderate
425D:						
Keswick	90	---	---	High	High	Moderate
425D2:						
Keswick	90	---	---	High	High	Moderate
428B:						
Ely	95	---	---	High	High	Moderate

Table 22.--Soil Features--Continued

Map symbol and soil name	Percent of map unit	Restrictive layer		Potential for frost action	Risk of corrosion	
		Kind	Depth to top		Uncoated steel	Concrete
			In			
430:						
Ackmore	90	---	---	High	High	Low
453:						
Tuskeego	95	---	---	High	High	Moderate
520:						
Coppock	95	---	---	High	High	Moderate
520B:						
Coppock	95	---	---	High	High	Moderate
570C:						
Nira	95	---	---	High	Moderate	Moderate
570C2:						
Nira	95	---	---	High	Moderate	Moderate
571C2:						
Hedrick	89	---	---	High	Moderate	Moderate
571D2:						
Hedrick	95	---	---	High	Moderate	Moderate
572C2:						
Inton	90	---	---	High	Moderate	Moderate
572D2:						
Inton	90	---	---	High	Moderate	Moderate
587:						
Chequest	90	---	---	High	High	Moderate
587+:						
Chequest	90	---	---	High	High	Moderate
687B:						
Watkins	90	---	---	High	Moderate	Moderate
688:						
Koszta	90	---	---	High	Moderate	Moderate
722:						
Nodaway	36	---	---	High	Moderate	Low
Ackmore	32	---	---	High	High	Low
Vesser	22	---	---	High	High	Moderate
730B:						
Nodaway	46	---	---	High	Moderate	Low
Coppock	27	---	---	High	High	Moderate
Cantril	17	---	---	High	Moderate	Low
779:						
Kalona	95	---	---	High	High	Moderate
792C2:						
Armstrong	90	---	---	High	High	Moderate

Table 22.--Soil Features--Continued

Map symbol and soil name	Percent of map unit	Restrictive layer: Kind	Restrictive layer: Depth to top	Potential for frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
			In			
792D2:						
Armstrong	95	---	---	High	High	Moderate
795C2:						
Ashgrove	95	---	---	High	High	Moderate
795D2:						
Ashgrove	82	---	---	High	High	Moderate
822D2:						
Lamoni	90	---	---	High	High	Moderate
876B:						
Ladoga	90	---	---	Moderate	Moderate	Moderate
876C2:						
Ladoga	90	---	---	Moderate	Moderate	Moderate
876D2:						
Ladoga	90	---	---	Moderate	Moderate	Moderate
880B:						
Clinton	95	---	---	Moderate	Moderate	Moderate
880C2:						
Clinton	95	---	---	Moderate	Moderate	Moderate
880D2:						
Clinton	95	---	---	Moderate	Moderate	Moderate
881B:						
Otley	95	---	---	Moderate	Moderate	Moderate
911B:						
Colo	57	---	---	High	High	Moderate
Ely	38	---	---	High	High	Moderate
993D2:						
Gara	48	---	---	Moderate	Moderate	Moderate
Armstrong	42	---	---	High	High	Moderate
993E2:						
Gara	48	---	---	Moderate	Moderate	Moderate
Armstrong	42	---	---	High	High	Moderate
994D2:						
Galland	65	---	---	High	High	Moderate
Douds	25	---	---	Moderate	Moderate	Moderate
994E2:						
Galland	55	---	---	High	High	Moderate
Douds	35	---	---	Moderate	Moderate	Moderate
999F:						
Nordness	62	Bedrock (lithic)	8-20	Low	Low	Low
Eleva	23	Bedrock (paralithic)	20-40	Low	Low	Low

Table 22.--Soil Features--Continued

Map symbol and soil name	Percent of map unit	Restrictive layer: Kind	Restrictive layer: Depth to top	Potential for frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
			In			
999G:						
Nordness	62	Bedrock (lithic)	8-20	Low	Low	Low
Eleva	23	Bedrock (paralithic)	20-40	Low	Low	Low
1075:						
Givin	90	---	---	High	High	Moderate
1220:						
Nodaway	90	---	---	High	Moderate	Low
1279:						
Taintor	95	---	---	High	High	Moderate
1280:						
Mahaska	95	---	---	High	High	Moderate
1315:						
Nodaway	57	---	---	High	Moderate	Low
Klum	38	---	---	Moderate	Low	Low
5010:						
Pits, sand and gravel.						
5020:						
Pits and Dumps	100	Bedrock (lithic)	0-4	---	---	---
5030:						
Pits, limestone quarries	100	Bedrock (lithic)	0-4	---	---	---
5040:						
Orthents, loamy.						
5048:						
Aquents.						
5060:						
Pits, clay.						
5080:						
Orthents, sanitary landfill.						
6051:						
Vesser	93	---	---	High	High	Moderate
6054:						
Zook	95	---	---	High	High	Moderate
6133:						
Colo	90	---	---	High	High	Moderate
6133+:						
Colo	90	---	---	High	High	Moderate
6220:						
Nodaway	90	---	---	High	Moderate	Low

Table 22.--Soil Features--Continued

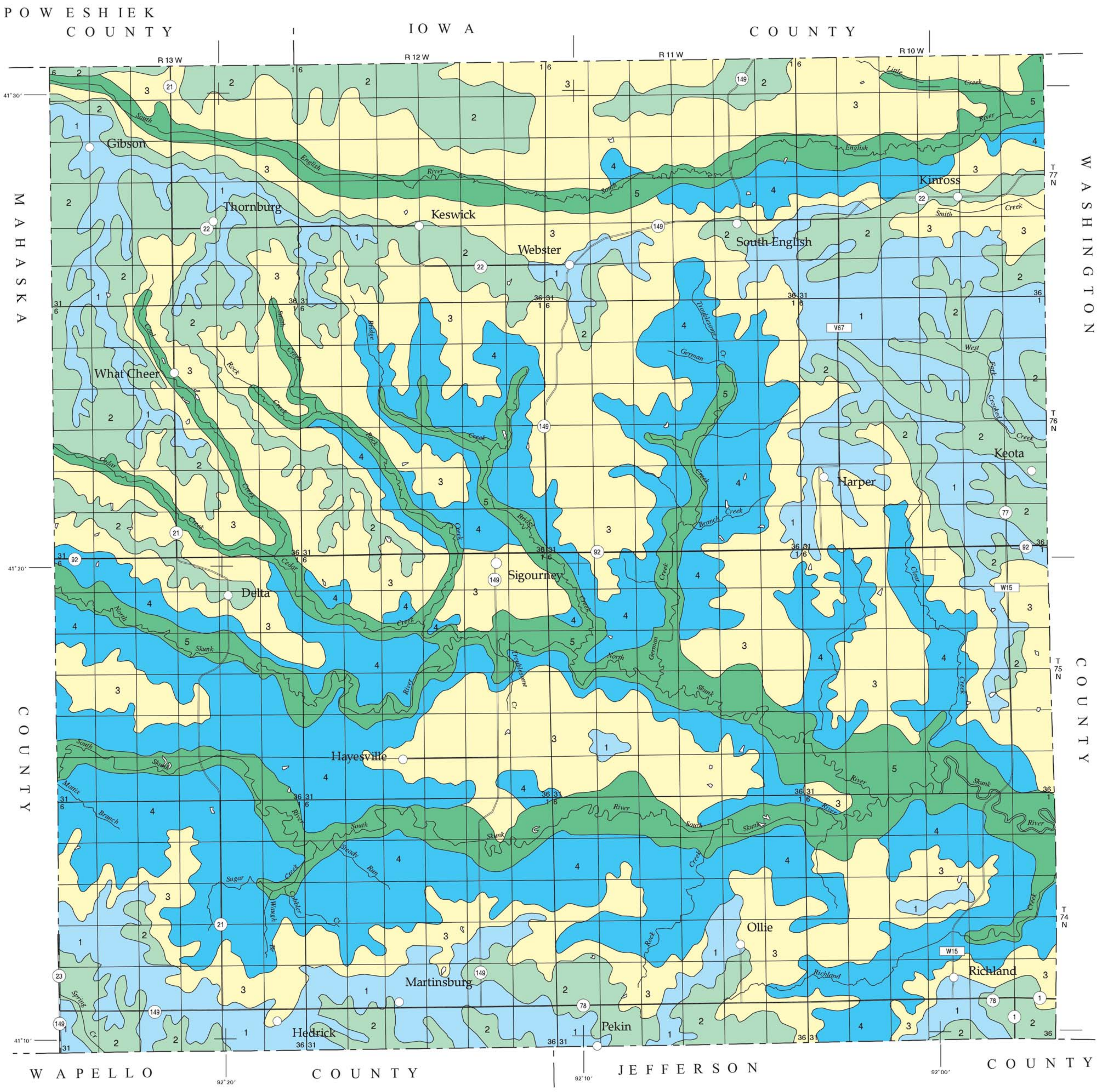
Map symbol and soil name	Percent of map unit	Restrictive layer: Kind	Restrictive layer: Depth to top	Potential for frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
			In			
6315:						
Nodaway	57	---	---	High	Moderate	Low
Klum	38	---	---	Moderate	Low	Low
6422:						
Amana	89	---	---	High	High	Moderate
6587:						
Chequest	90	---	---	High	High	Moderate
AW:						
Animal waste.						
SL:						
Sewage lagoon.						
W:						
Water.						

Table 23.--Classification of the Soils

(An asterisk in the first column indicates a taxadjunct. See text for a description of those characteristics that are outside the range for the series.)

Soil name	Family or higher taxonomic class
Ackmore	Fine-silty, mixed, superactive, nonacid, mesic Aeric Fluvaquents
*Adair	Fine, smectitic, mesic Aquertic Argiudolls
Amana	Fine-silty, mixed, superactive, mesic Aquic Hapludolls
Armstrong	Fine, smectitic, mesic Aquertic Hapludalfs
Ashgrove	Fine, smectitic, mesic Aeric Chromic Vertic Epiaqualfs
Billett	Coarse-loamy, mixed, superactive, mesic Mollic Hapludalfs
Bucknell	Fine, smectitic, mesic Vertic Epiaqualfs
Cantril	Fine-loamy, mixed, superactive, mesic Udollic Endoaqualfs
Chelsea	Mixed, mesic Argic Udipsamments
Chequest	Fine, smectitic, mesic Vertic Endoaquolls
*Clarinda	Fine, smectitic, mesic Vertic Argiaquolls
Clinton	Fine, smectitic, mesic Chromic Vertic Hapludalfs
Colo	Fine-silty, mixed, superactive, mesic Cumulic Endoaquolls
Coppock	Fine-silty, mixed, superactive, mesic Mollic Endoaqualfs
Douds	Fine-loamy, mixed, superactive, mesic Typic Hapludalfs
Dunbarton	Clayey, smectitic, mesic Lithic Hapludalfs
Eleva	Coarse-loamy, mixed, active, mesic Typic Hapludalfs
Ely	Fine-silty, mixed, superactive, mesic Aquic Cumulic Hapludolls
Fayette	Fine-silty, mixed, superactive, mesic Typic Hapludalfs
Galland	Fine, smectitic, mesic Aquertic Chromic Hapludalfs
Gara	Fine-loamy, mixed, superactive, mesic Mollic Hapludalfs
Givin	Fine, smectitic, mesic Udollic Endoaqualfs
Gosport	Fine, illitic, mesic Oxyaquic Dystrudepts
Hedrick	Fine-silty, mixed, superactive, mesic Oxyaquic Hapludalfs
Inton	Fine-silty, mixed, superactive, mesic Oxyaquic Hapludalfs
Judson	Fine-silty, mixed, superactive, mesic Cumulic Hapludolls
Kalona	Fine, smectitic, mesic Vertic Endoaquolls
Keomah	Fine, smectitic, mesic Aeric Endoaqualfs
Keswick	Fine, smectitic, mesic Aquertic Chromic Hapludalfs
Klum	Coarse-loamy, mixed, superactive, nonacid, mesic Mollic Udifluvents
Koszta	Fine-silty, mixed, superactive, mesic Udollic Endoaqualfs
Ladoga	Fine, smectitic, mesic Vertic Hapludalfs
*Lamoni	Fine, smectitic, mesic Aquertic Argiudolls
Lindley	Fine-loamy, mixed, superactive, mesic Typic Hapludalfs
Mahaska	Fine, smectitic, mesic Aquertic Argiudolls
*Nira	Fine-silty, mixed, superactive, mesic Oxyaquic Hapludolls
Nodaway	Fine-silty, mixed, superactive, nonacid, mesic Mollic Udifluvents
Nordness	Loamy, mixed, superactive, mesic Lithic Hapludalfs
Olmitz	Fine-loamy, mixed, superactive, mesic Cumulic Hapludolls
Orthents	Mesic Orthents
*Otley	Fine, smectitic, mesic Oxyaquic Vertic Argiudolls
Rinda	Fine, smectitic, mesic Vertic Epiaqualfs
Rubio	Fine, smectitic, mesic Vertic Albaqualfs
*Shelby	Fine-loamy, mixed, superactive, mesic Typic Argiudolls
Sperry	Fine, smectitic, mesic Typic Argialbolls
Taintor	Fine, smectitic, mesic Vertic Argiaquolls
Tuskeego	Fine, smectitic, mesic Mollic Endoaqualfs
Vesser	Fine-silty, mixed, superactive, mesic Argiaquic Argialbolls
Watkins	Fine-silty, mixed, superactive, mesic Mollic Hapludalfs
Zook	Fine, smectitic, mesic Cumulic Vertic Endoaquolls

N



SOIL LEGEND*

- 1 Taintor-Mahaska association
- 2 Otley-Mahaska-Nira association
- 3 Ladoga-Gara-Hedrick association
- 4 Clinton-Lindley-Keswick association
- 5 Nodaway-Colo-Vesser association

Compiled 1998

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
IOWA AGRICULTURE AND HOME ECONOMICS EXPERIMENT STATION
COOPERATIVE EXTENSION SERVICE,
IOWA STATE UNIVERSITY
DIVISION OF SOIL CONSERVATION,
IOWA DEPARTMENT OF AGRICULTURE
and LAND STEWARDSHIP

GENERAL SOIL MAP

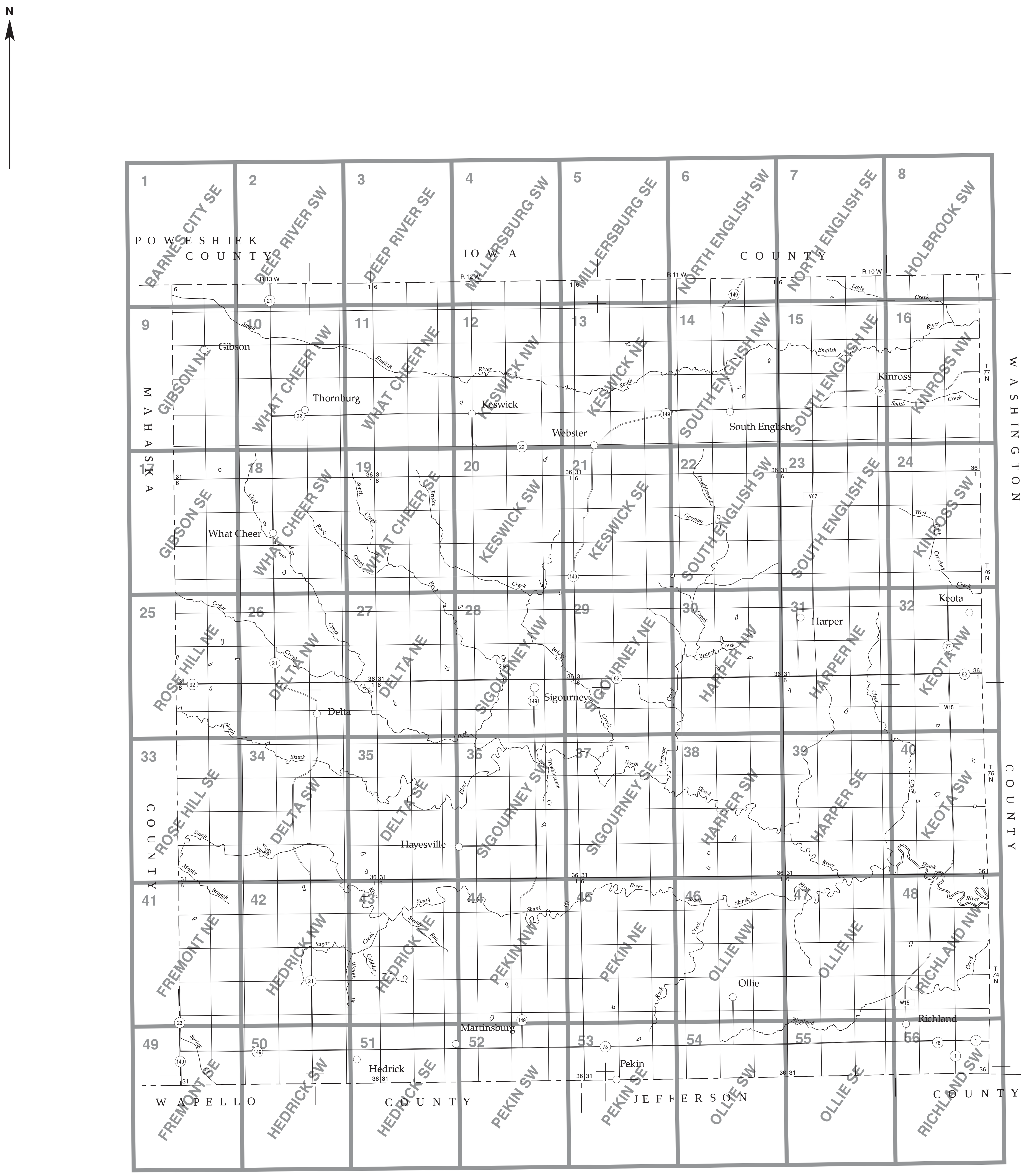
KEOKUK COUNTY, IOWA

Scale 1:126720

MILES

KILOMETERS

Each area outlined on this map consists of more than one kind of soil. The map is meant for general planning rather than a basis for decisions on the use of specific tracts.



SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

INDEX TO MAP SHEETS

KEOKUK COUNTY, IOWA

Scale 1:126720

MILES

KILOMETERS

Definitions of Special Symbols

Name	Definition
Escarpment, bedrock	A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. The exposed material is hard or soft bedrock. Typically ½ acre to 2 acres.
Gully	A channel with steep sides cut by running water and through which water ordinarily runs only after rainfall or snowmelt. Generally an obstacle to wheeled vehicles and too deep to be obliterated by ordinary tillage.
Mine or quarry	An open excavation from which soil and underlying material have been removed and the bedrock exposed. Also used to denote surface openings to underground mines. Typically ¼ acre to 2 acres.
Rock outcrop	An exposure of bedrock at the surface of the earth. Not used where the named soils of the surrounding map unit are shallow over bedrock. Typically ¼ acre to 2 acres.
Sandy spot	A zone in which the surface layer has more than 75 percent sand in an area where the surface layer of the named soils in the surrounding map unit have less than about 25 percent sand. Typically ¼ acre to 2 acres.
Area of Gosport soil	An inclusion of Gosport soil that is too small to map at the selected scale. Typically less than ½ acre to 2 acres.
Area of Sperry soil	An inclusion of Sperry soil that is too small to map at the selected scale. Typically less than ½ acre to 2 acres.
Area of glacial till	An inclusion of glacial till that is too small to map at the selected scale. Typically less than ½ acre to 2 acres.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

KEOKUK COUNTY, IOWA
BARNES CITY SE QUADRANGLE
SHEET NUMBER 1 OF 56

(Joins sheet 9, Gibson NE)

SCALE 1:12000

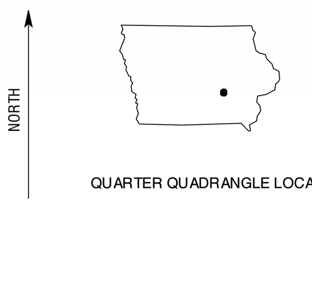
0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

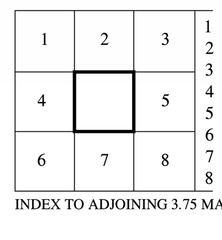
0.5 0 0.5
KILOMETERS

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.



QUARTER QUADRANGLE LOCATION



1 BARNES CITY NW
2 BARNES CITY NE
3 DEEP RIVER NW
4 BARNES CITY SW
5 DEEP RIVER SW
6 GIBSON NW
7 GIBSON NE
8 WHAT CHEER NW

INDEX TO ADJOINING 3.75 MAPS

BARNES CITY SE, IOWA
3.75 MINUTE SERIES
SHEET NUMBER 1 OF 56

92° 22'30" R. 13 W. 92°18'45"
41° 33'45" 41° 33'45"

(Joins sheet 1, Barnes City SE)

(Joins sheet 3, Deep River SE)

41° 30'00" R. 13 W. 41° 30'00"
92° 22'30" 92°18'45"

(Joins sheet 10, What Cheer NW)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 BARNES CITY NE
2 DEEP RIVER NW
3 DEEP RIVER NE
4 BARNES CITY SE
5 DEEP RIVER SE
6 GIBSON NE
7 WHAT CHEER NW
8 WHAT CHEER NE

INDEX TO ADJOINING 3.75 MAPS

DEEP RIVER SW, IOWA
3.75 MINUTE SERIES
SHEET NUMBER 2 OF 56

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

KEOKUK COUNTY, IOWA
DEEP RIVER SE QUADRANGLE
SHEET NUMBER 3 OF 56

(Joins sheet 11, What Cheer NE)

SCALE 1:12000

MILES

FEET

KILOMETERS

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.

QUARTER QUADRANGLE LOCATION

1 DEEP RIVER NW
2 DEEP RIVER NE
3 MILLERSBURG NW
4 DEEP RIVER SW
5 MILLERSBURG SW
6 WHAT CHEER NW
7 WHAT CHEER NE
8 KESWICK NW

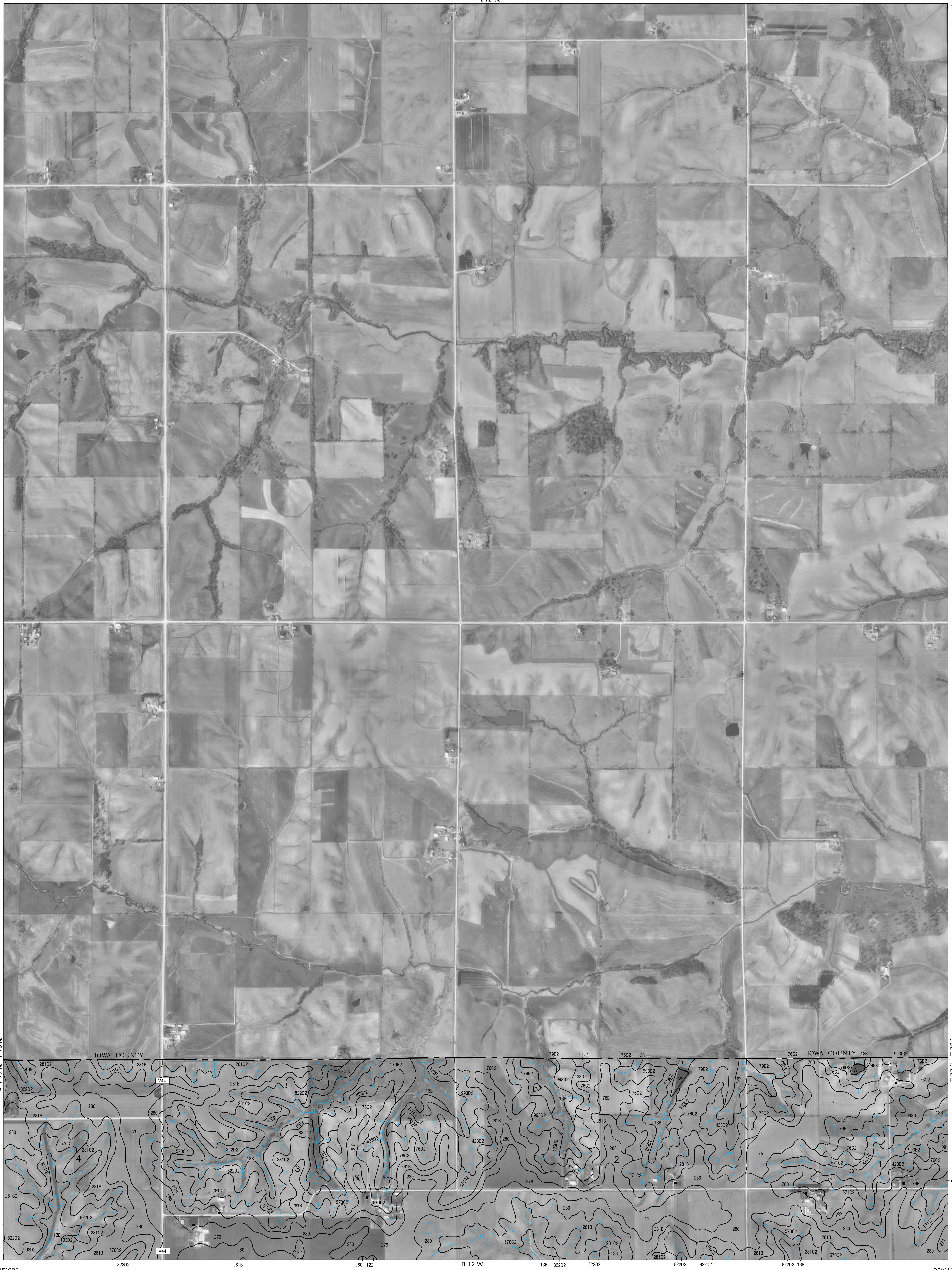
INDEX TO ADJOINING 3.75 MAPS

DEEP RIVER SE, IOWA
3.75 MINUTE SERIES
SHEET NUMBER 3 OF 56

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

KEOKUK COUNTY, IOWA
MILLERSBURG SW QUADRANGLE
SHEET NUMBER 4 OF 56

92°15′00″ 41°33′45″ R. 12 W. 92°11′15″ 41°33′45″



41°30′00″ 92°15′00″ R. 12 W. 41°30′00″ 92°11′15″

(Joins sheet 12, Keswick NW)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 15.
Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 DEEP RIVER NE
2 MILLERSBURG NW
3 MILLERSBURG NE
4 DEEP RIVER SE
5 MILLERSBURG SE
6 WHAT CHEER NE
7 KESWICK NW
8 KESWICK NE

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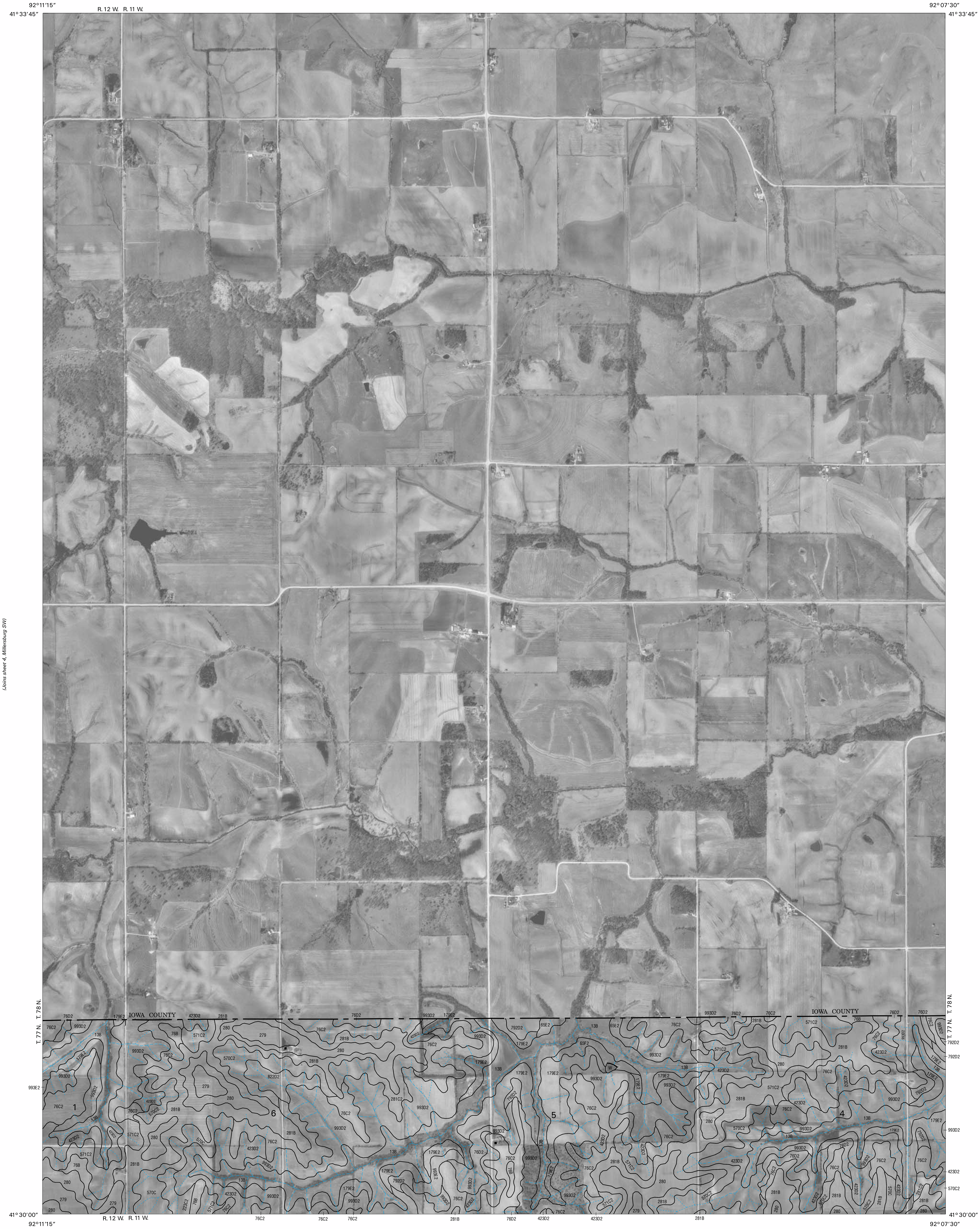
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

KEOKUK COUNTY, IOWA
MILLERSBURG SE QUADRANGLE
SHEET NUMBER 5 OF 56



(Joins sheet 13, Keswick NE)

SCALE 1:12000

MILES

FEET

KILOMETERS

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH

QUARTER QUADRANGLE LOCATION

1 MILLERSBURG NW
2 MILLERSBURG NE
3 NORTH ENGLISH NW
4 MILLERSBURG SW
5 NORTH ENGLISH SW
6 KESWICK NW
7 KESWICK NE
8 SOUTH ENGLISH NW

INDEX TO ADJOINING 3.75 MAPS

MILLERSBURG SE, IOWA
3.75 MINUTE SERIES
SHEET NUMBER 5 OF 56

92° 07′30″ 41° 33′45″ — 92° 03′45″ 41° 33′45″

R. 11 W. R. 10 W.

(Joins sheet 5, Millersburg SE)

(Joins sheet 7, North English SE)

41° 30′00″ 92° 07′30″ — R. 11 W. R. 10 W. 41° 30′00″ 92° 03′45″

(Joins sheet 14, South English NW)

SCALE 1:12000

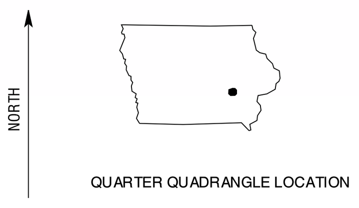
MILES 0.5 0 0.5

FEET 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS 0.5 0 0.5

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.



QUARTER QUADRANGLE LOCATION

1	2	3
4		5
6	7	8

1 MILLERSBURG NE
2 NORTH ENGLISH NW
3 NORTH ENGLISH NE
4 MILLERSBURG SE
5 NORTH ENGLISH SE
6 KESWICK NE
7 SOUTH ENGLISH NW
8 SOUTH ENGLISH NE

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UNITED STATES
DEPARTMENT OF AGRICULTURE
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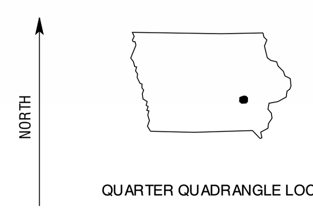
KEOKUK COUNTY, IOWA
NORTH ENGLISH SE QUADRANGLE
SHEET NUMBER 7 OF 56

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

1	2	3
4		5
6	7	8

1 NORTH ENGLISH NW
2 NORTH ENGLISH NE
3 HOLBROOK NW
4 NORTH ENGLISH SW
5 HOLBROOK SW
6 SOUTH ENGLISH NW
7 SOUTH ENGLISH NE
8 KINROSS NW

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NORTH ENGLISH SE, IOWA
3.75 MINUTE SERIES
SHEET NUMBER 7 OF 56

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

KEOKUK COUNTY, IOWA
HOLBROOK SW QUADRANGLE
SHEET NUMBER 8 OF 56

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH

QUARTER QUADRANGLE LOCATION

(Joins sheet 16, Kinross NW)

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 NORTH ENGLISH NE
2 HOLBROOK NW
3 HOLBROOK NE
4 NORTH ENGLISH SE
5 HOLBROOK SE
6 SOUTH ENGLISH NE
7 KINROSS NW
8 KINROSS NE

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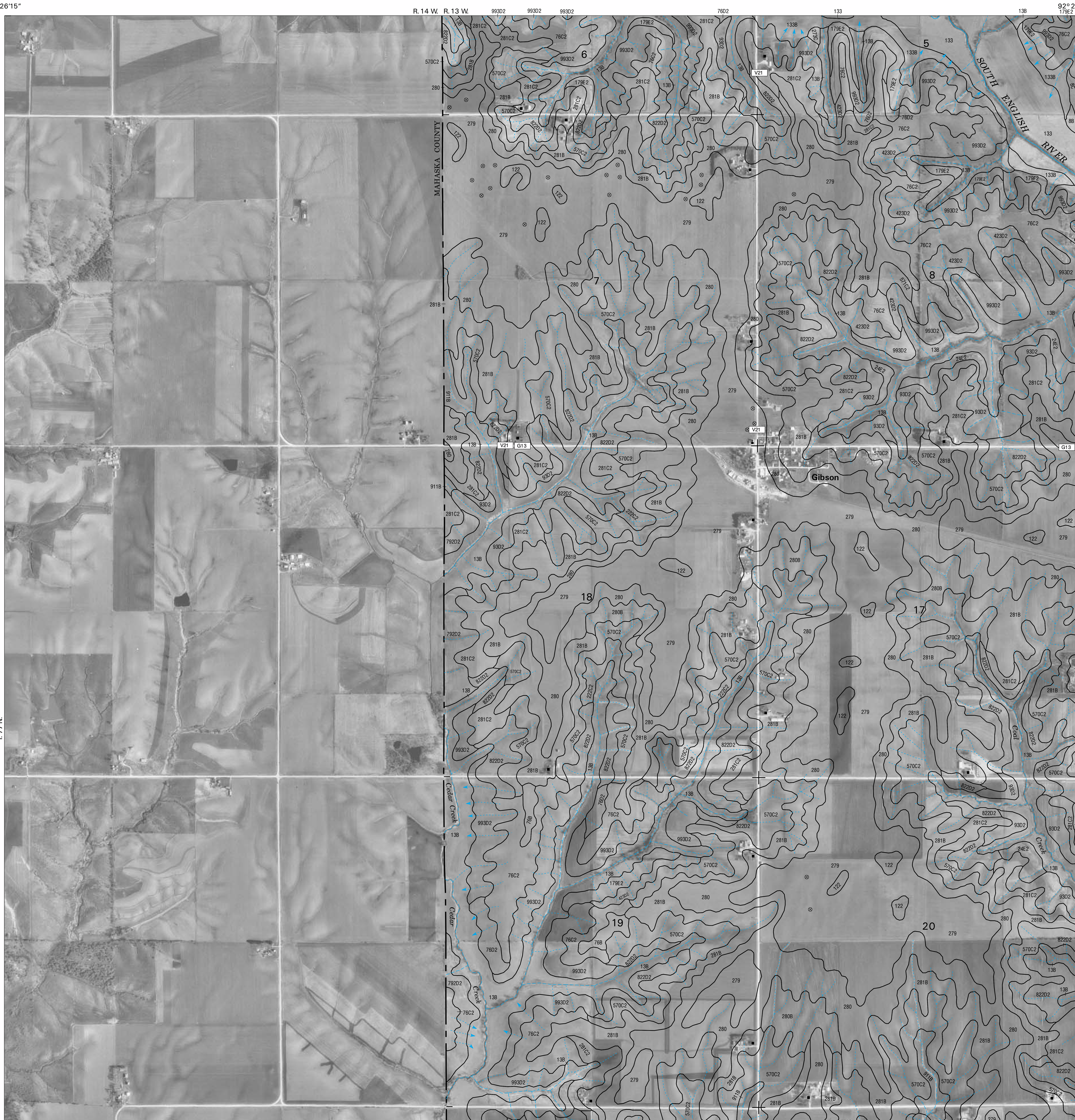
3.75 MINUTE SERIES
SHEET NUMBER 8 OF 56

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

(Joins sheet 1, Barnes City SE)



(Joins sheet 10, What Cheer NW)

(Joins sheet 17, Gibson SE)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 BARNES CITY SW
2 BARNES CITY SE
3 DEEP RIVER SW
4 GIBSON NW
5 WHAT CHEER NW
6 GIBSON SW
7 GIBSON SE
8 WHAT CHEER SW

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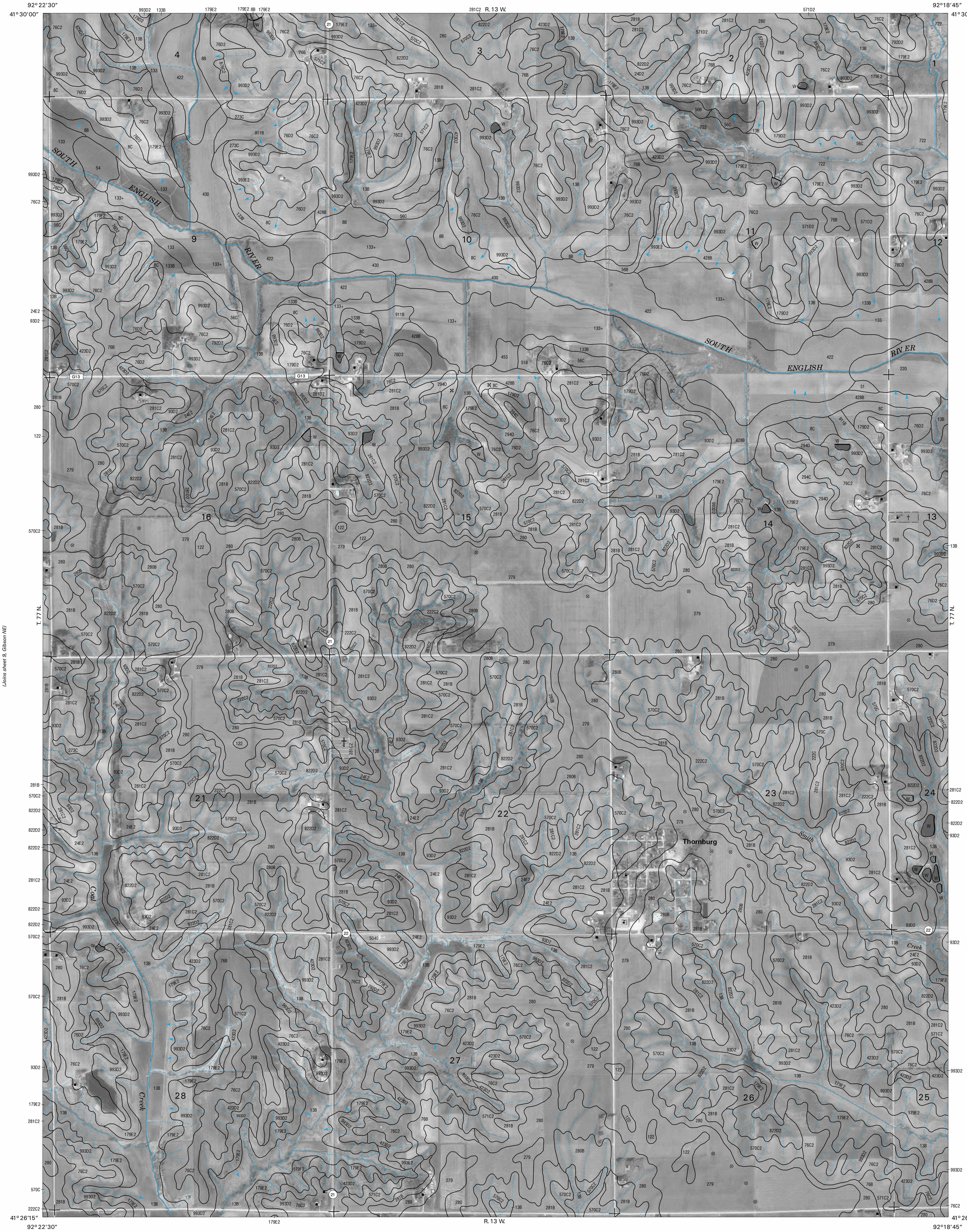
KEOKUK COUNTY, IOWA
WHAT CHEER NW QUADRANGLE
SHEET NUMBER 10 OF 56

(Joins sheet 2, Deep River SW)



(Joins sheet 18, What Cheer SW)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES: 0.5 0 0.5

FEET: 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS: 0.5 0 0.5

1 BARNES CITY SE
2 DEEP RIVER SW
3 DEEP RIVER SE
4 GIBSON NE
5 WHAT CHEER NE
6 GIBSON SE
7 WHAT CHEER SW
8 WHAT CHEER SE

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DEPARTMENT OF AGRICULTURE
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KEOKUK COUNTY, IOWA
WHAT CHEER NE QUADRANGLE
SHEET NUMBER 11 OF 56

(Joins sheet 3, Deep River SE)

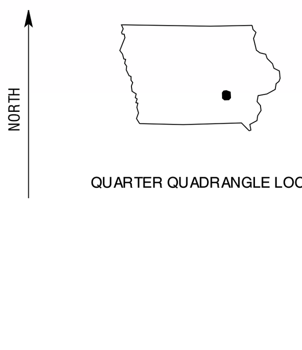
92°18′45″ 41°30′00″ — 92°15′00″ 41°30′00″

41°26′15″ 92°18′45″ — 41°26′15″ 92°15′00″

(Joins sheet 19, What Cheer SE)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES: 0.5 — 0 — 0.5
FEET: 500 — 0 — 500 — 1000 — 1500 — 2000 — 2500 — 3000 — 3500
KILOMETERS: 0.5 — 0 — 0.5

1	2	3
4		5
6	7	8

1 DEEP RIVER SW
2 DEEP RIVER SE
3 MILLERSBURG SW
4 WHAT CHEER NW
5 KESWICK NW
6 WHAT CHEER SW
7 WHAT CHEER SE
8 KESWICK SW

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DEPARTMENT OF AGRICULTURE
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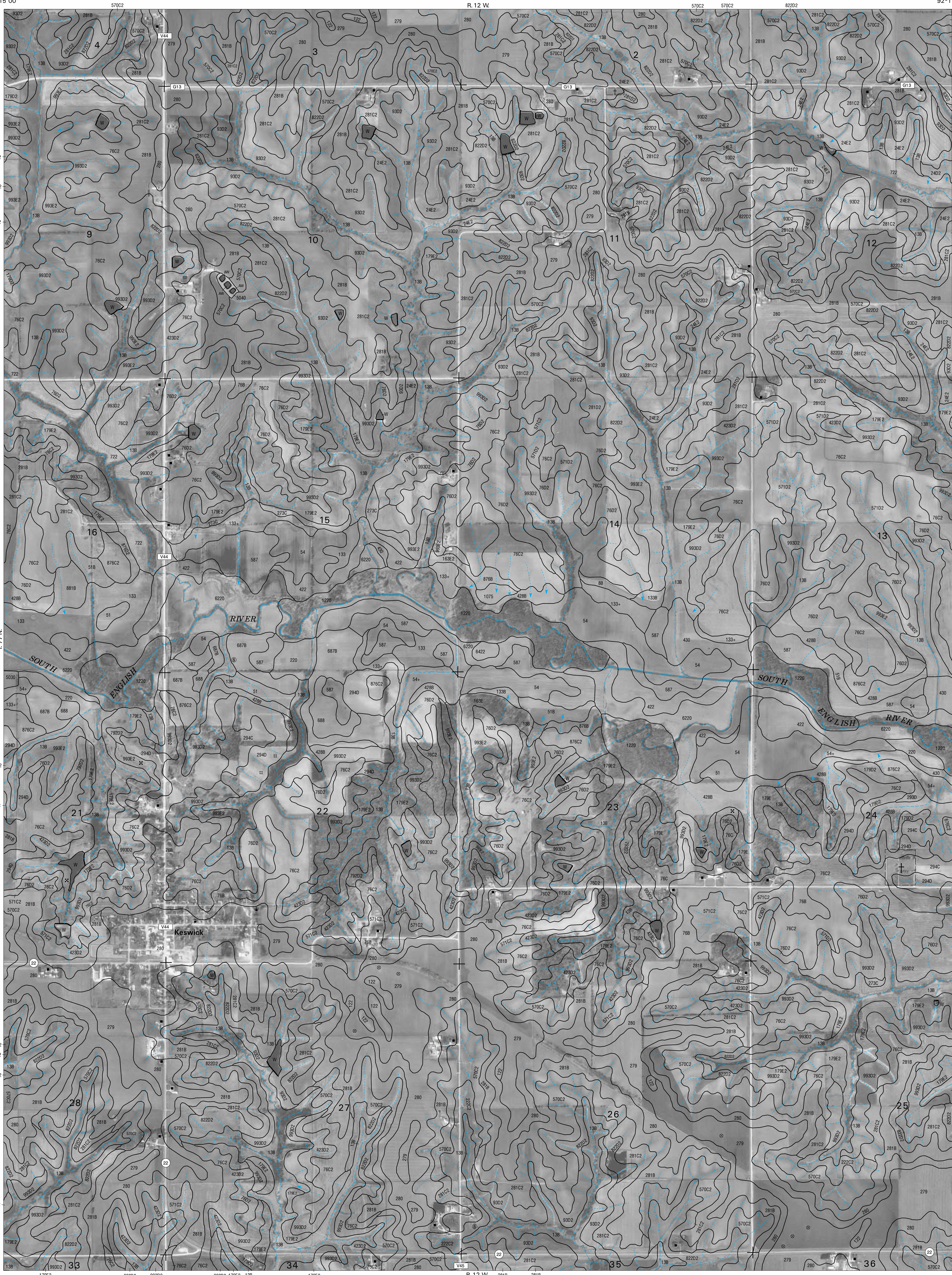
KEOKUK COUNTY, IOWA
KESWICK NW QUADRANGLE
SHEET NUMBER 12 OF 56

(Joins sheet 4, Millersburg SW)



(Joins sheet 11, What Cheer NE)

(Joins sheet 13, Keswick NE)

(Joins sheet 20, Keswick SW)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 DEEP RIVER SE
2 MILLERSBURG SW
3 MILLERSBURG SE
4 WHAT CHEER NE
5 KESWICK NE
6 WHAT CHEER SE
7 KESWICK SW
8 KESWICK SE

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KEOKUK COUNTY, IOWA
KESWICK NE QUADRANGLE
SHEET NUMBER 13 OF 56

(Joins sheet 5, Millersburg SE)

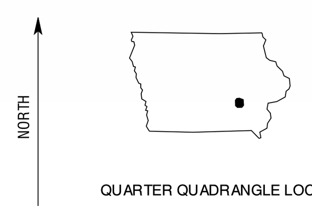
(Joins sheet 12, Keswick NW)

(Joins sheet 14, South English NW)

(Joins sheet 21, Keswick SE)

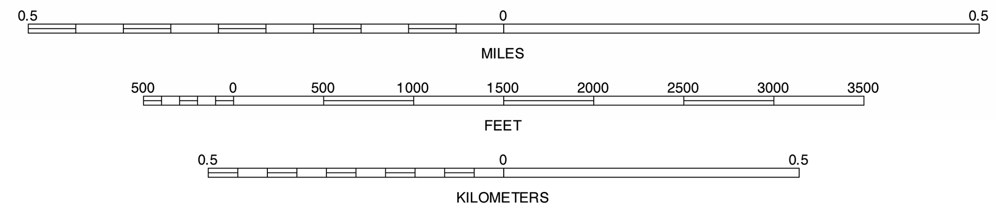
This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000



1	2	3
4		5
6	7	8

1 MILLERSBURG SW
2 MILLERSBURG SE
3 NORTH ENGLISH SW
4 KESWICK NW
5 SOUTH ENGLISH NW
6 KESWICK SW
7 KESWICK SE
8 SOUTH ENGLISH SW

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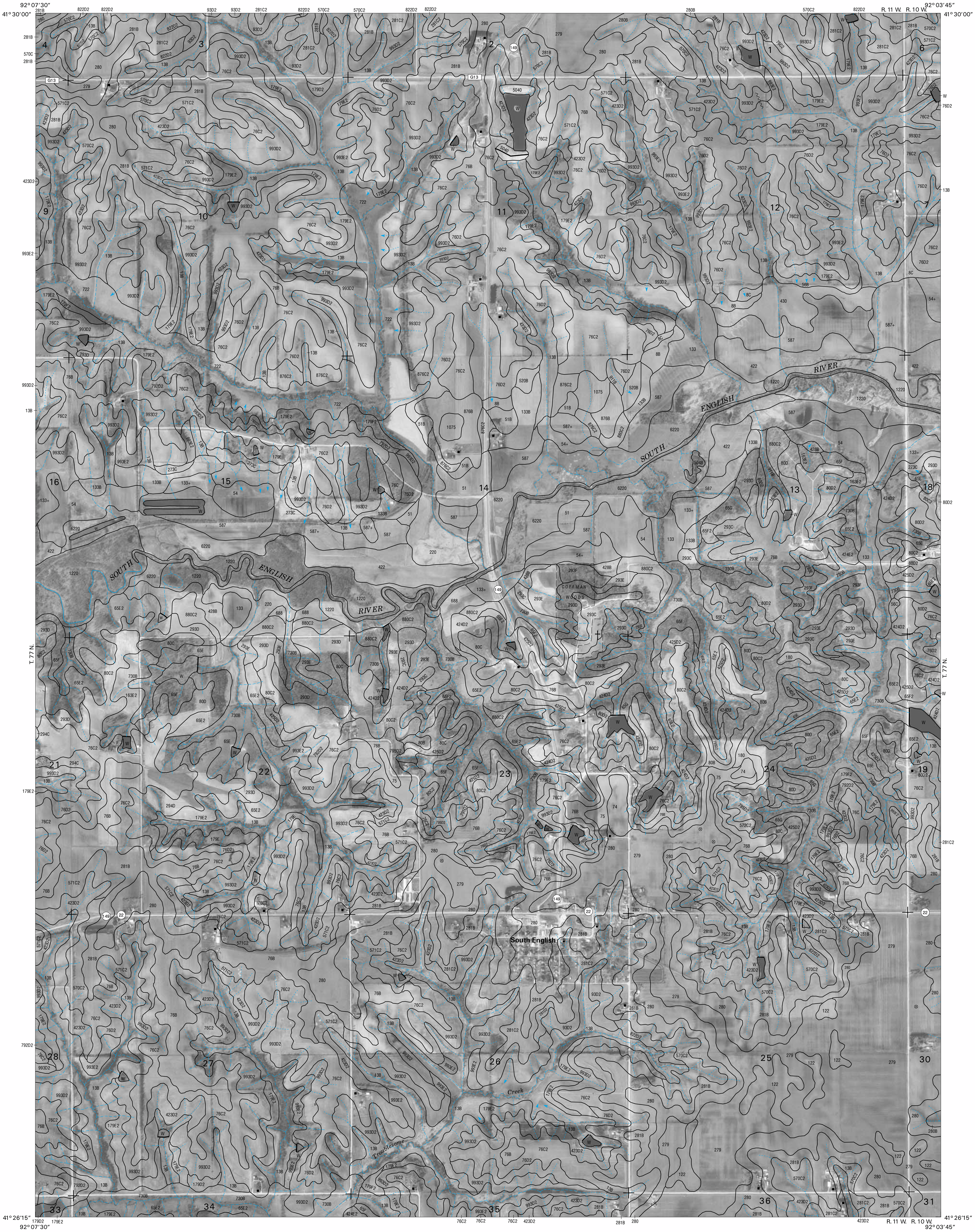
KEOKUK COUNTY, IOWA
SOUTH ENGLISH NW QUADRANGLE
SHEET NUMBER 14 OF 56

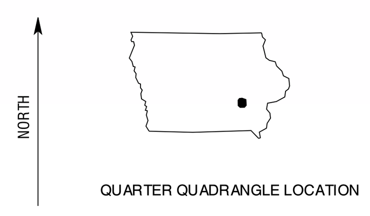
(Joins sheet 6, North English SW)



(Joins sheet 22, South English SW)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 15.
Coordinate grid ticks and land division data, if shown, are approximately positioned.



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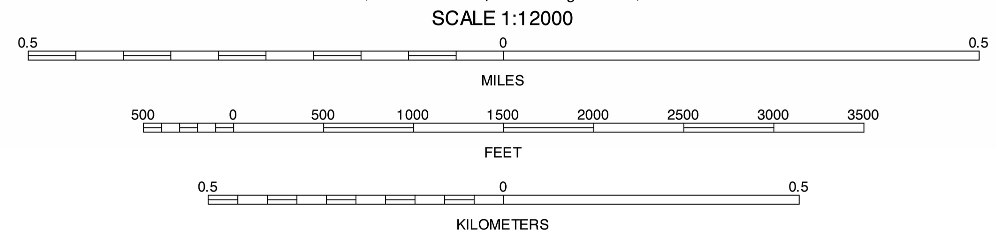

1	2	3
4		5
6	7	8

1 MILLERSBURG SE
2 NORTH ENGLISH SW
3 NORTH ENGLISH SE
4 KESWICK NE
5 SOUTH ENGLISH NE
6 KESWICK SE
7 SOUTH ENGLISH SW
8 SOUTH ENGLISH SE

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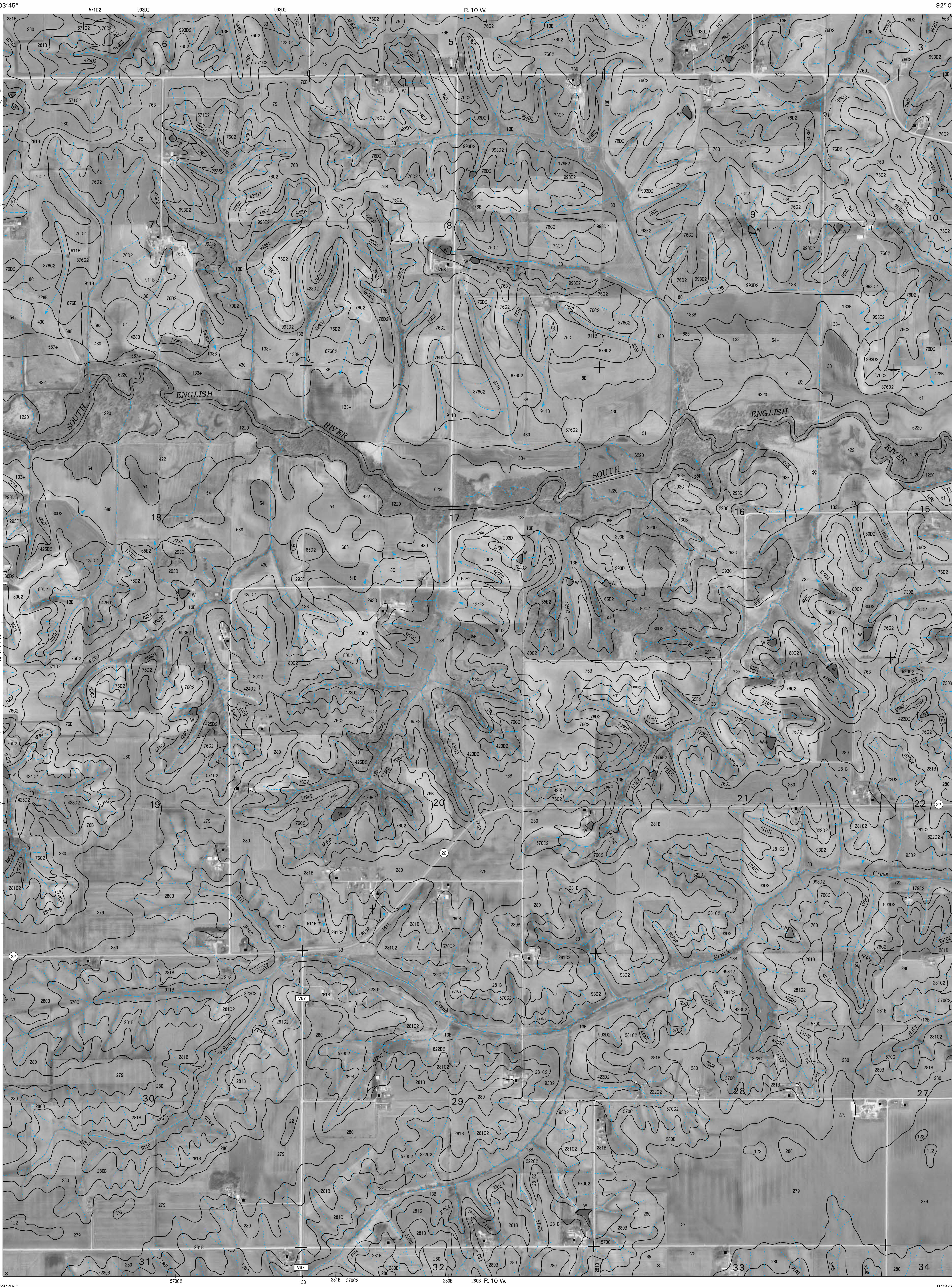
SOUTH ENGLISH NW, IOWA
3.75 MINUTE SERIES
SHEET NUMBER 14 OF 56

(Joins sheet 7, North English SE)

92° 03′ 45″ 41° 30′ 00″

92° 00′ 00″ 41° 30′ 00″



(Joins sheet 14, South English NW)

(Joins sheet 16, Kinross NW)

41° 26′ 15″ 92° 03′ 45″

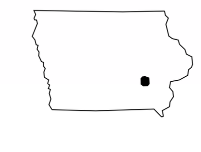
41° 26′ 15″ 92° 00′ 00″

(Joins sheet 23, South English SE)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5 MILES

500 0 500 1000 1500 2000 2500 3000 3500 FEET

0.5 0 0.5 KILOMETERS

1	2	3
4		5
6	7	8

1 NORTH ENGLISH SW
2 NORTH ENGLISH SE
3 HOLBROOK SW
4 SOUTH ENGLISH NW
5 KINROSS NW
6 SOUTH ENGLISH SW
7 SOUTH ENGLISH SE
8 KINROSS SW

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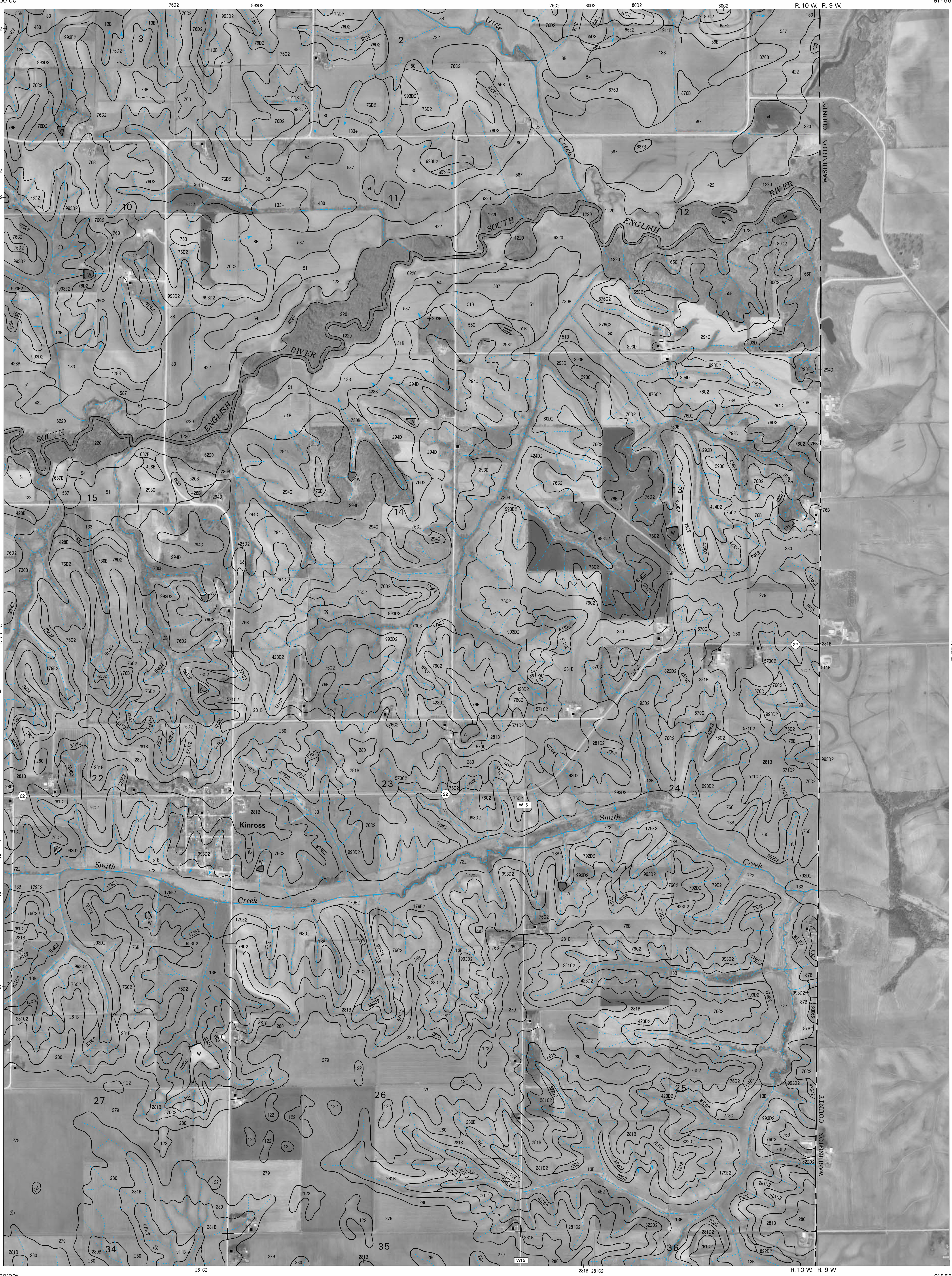
KEOKUK COUNTY, IOWA
KINROSS NW QUADRANGLE
SHEET NUMBER 16 OF 56

(Joins sheet 8, Holbrook SW)



(Joins sheet 24, Kinross SW)

SCALE 1:12000

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 15.
Coordinate grid ticks and land division data, if shown, are approximately positioned.

QUARTER QUADRANGLE LOCATION

MILES: 0.5 0 0.5
FEET: 500 0 500 1000 1500 2000 2500 3000 3500
KILOMETERS: 0.5 0 0.5

1	2	3
4		5
6	7	8

1 NORTH ENGLISH SE
2 HOLBROOK SW
3 HOLBROOK SE
4 SOUTH ENGLISH NE
5 KINROSS NE
6 SOUTH ENGLISH SE
7 KINROSS SW
8 KINROSS SE

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UNITED STATES
DEPARTMENT OF AGRICULTURE
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KEOKUK COUNTY, IOWA
GIBSON SE QUADRANGLE
SHEET NUMBER 17 OF 56

(Joins sheet 9, Gibson NE)

(Joins sheet 18, What Cheer SW)

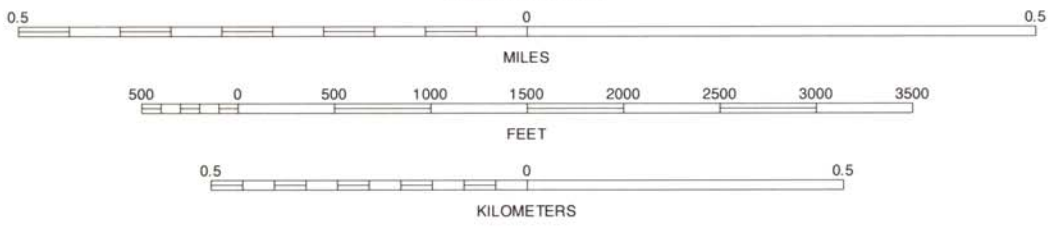
(Joins sheet 25, Rose Hill NE)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.

QUARTER QUADRANGLE LOCATION

SCALE 1:12000



1	2	3
4		5
6	7	8

1 GIBSON NW
2 GIBSON NE
3 WHAT CHEER NW
4 GIBSON SW
5 WHAT CHEER SW
6 ROSE HILL NW
7 ROSE HILL NE
8 DELTA NW

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KEOKUK COUNTY, IOWA
WHAT CHEER SW QUADRANGLE
SHEET NUMBER 18 OF 56

(Joins sheet 10, What Cheer NW)

92° 22' 30"
41° 26' 15"

92°18' 45"
41° 26' 15"

(Joins sheet 17, Gibson SE)

(Joins sheet 19, What Cheer SE)

41° 22' 30"
92° 22' 30"

41° 22' 30"
92°18' 45"

(Joins sheet 26, Delta NW)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 GIBSON NE
2 WHAT CHEER NW
3 WHAT CHEER NE
4 GIBSON SE
5 WHAT CHEER SE
6 ROSE HILL NE
7 DELTA NW
8 DELTA NE

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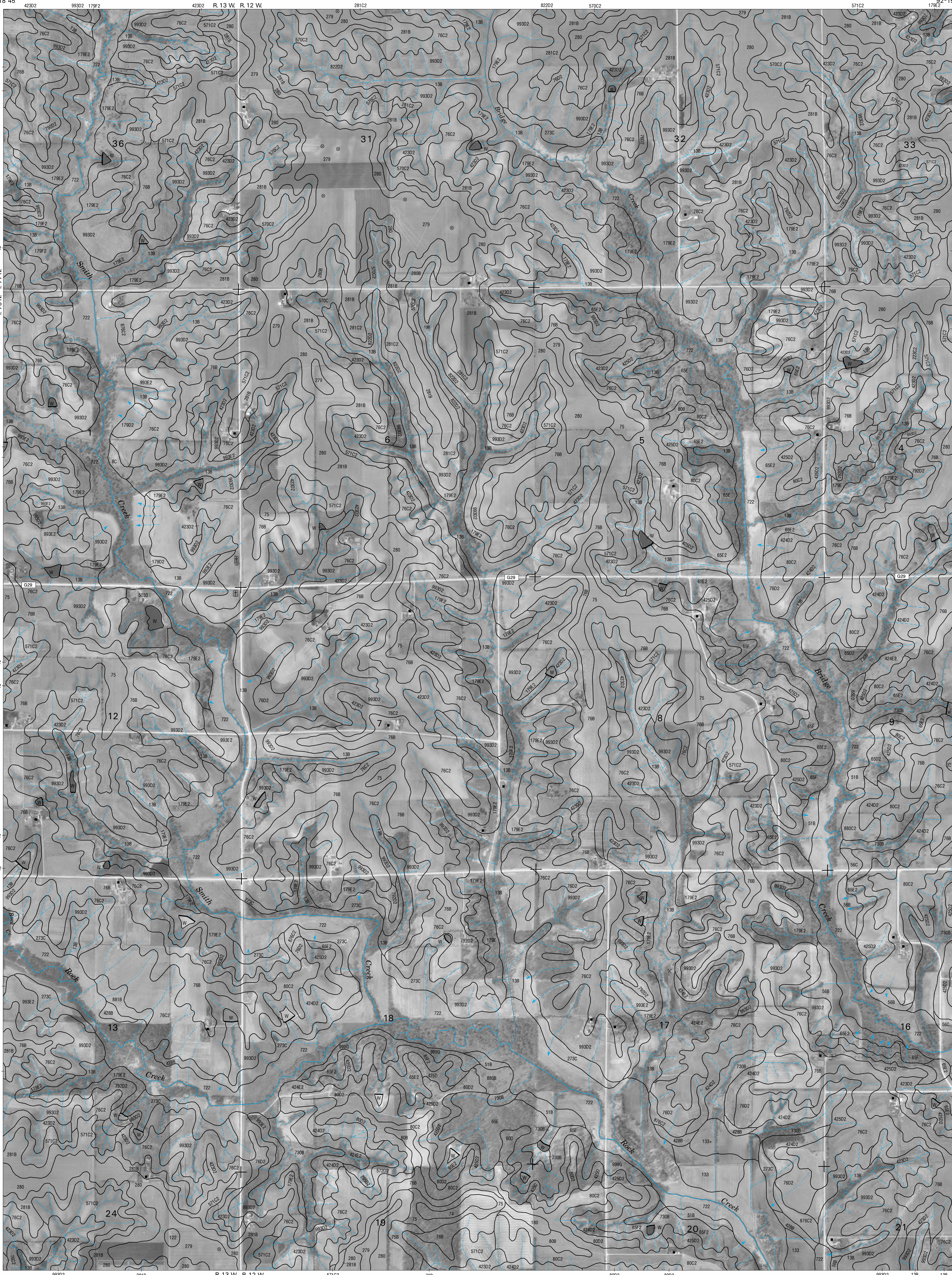
WHAT CHEER SW, IOWA
3.75 MINUTE SERIES
SHEET NUMBER 18 OF 56

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

KEOKUK COUNTY, IOWA
WHAT CHEER SE QUADRANGLE
SHEET NUMBER 19 OF 56

(Joins sheet 11, What Cheer NE)

92°18'45" 41°26'15" 92°15'00" 41°26'15"



(Joins sheet 18, What Cheer SW)

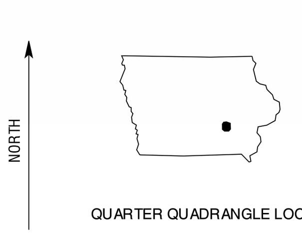
(Joins sheet 20, Keswick SW)

41°22'30" 92°18'45" 41°22'30" 92°15'00"

(Joins sheet 27, Delta NE)

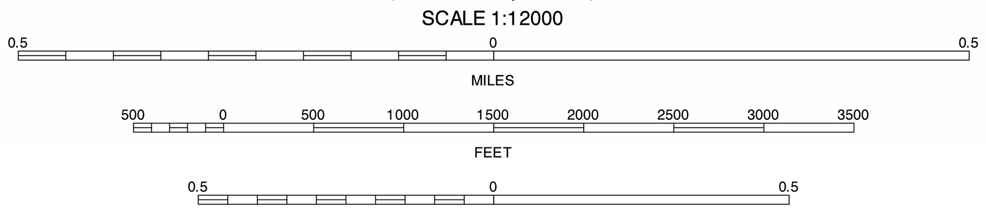
This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000



1	2	3
4		5
6	7	8

1 WHAT CHEER NW
2 WHAT CHEER NE
3 KESWICK NW
4 WHAT CHEER SW
5 KESWICK SW
6 DELTA NW
7 DELTA NE
8 SIGOURNEY NW

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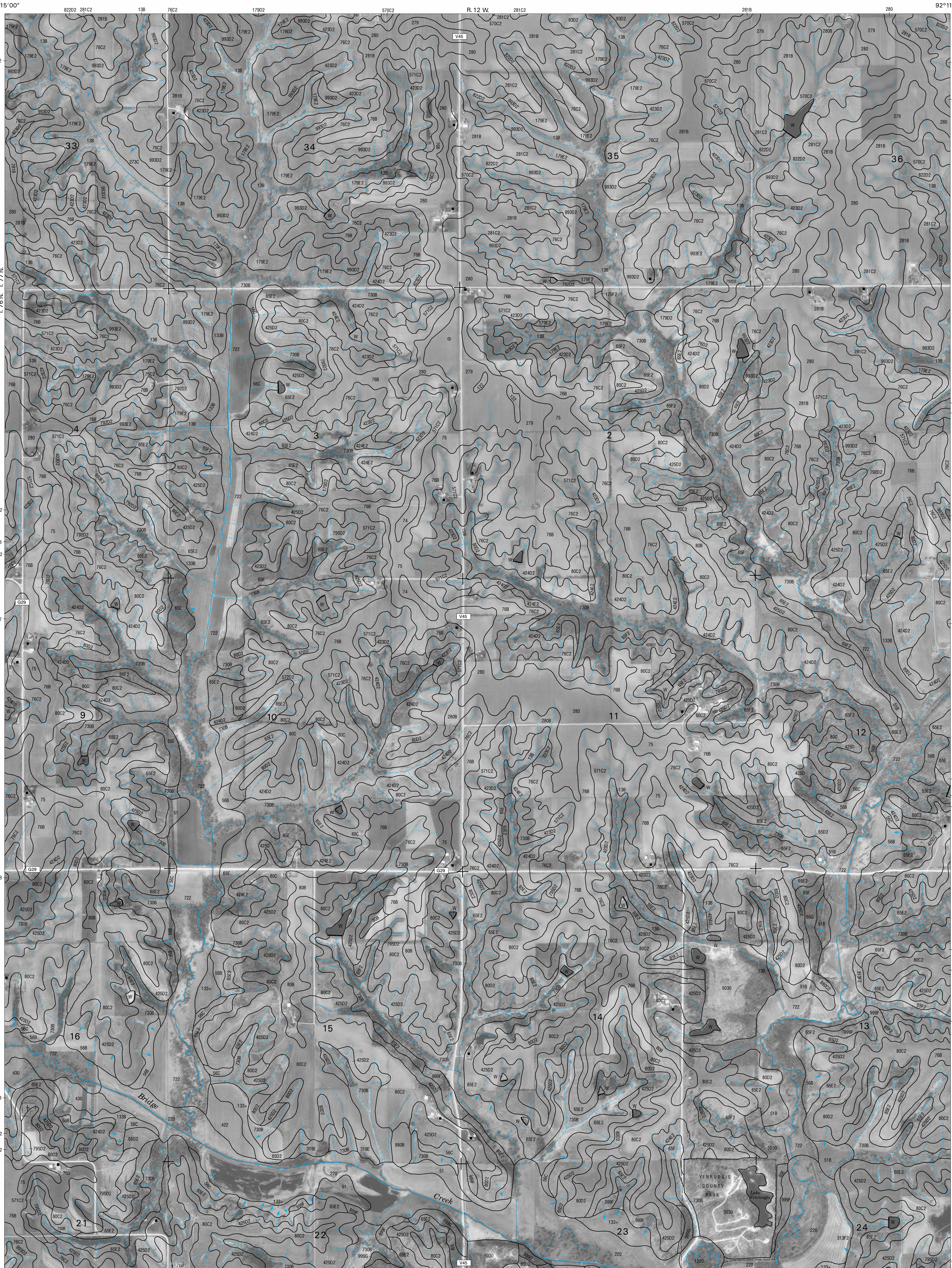
KEOKUK COUNTY, IOWA
KESWICK SW QUADRANGLE
SHEET NUMBER 20 OF 56

(Joins sheet 12, Keswick NW)

92°15'00"   41° 26'15"   92°11'15"   41° 26'15"



41° 22'30"   92°15'00"   41° 22'30"   92°11'15"

(Joins sheet 28, Sigourney NW)

SCALE 1:12000

MILES: 0.5 0 0.5
FEET: 500 0 500 1000 1500 2000 2500 3000 3500
KILOMETERS: 0.5 0 0.5

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH

QUARTER QUADRANGLE LOCATION

1	2	3
4		5
6	7	8

1 WHAT CHEER NE
2 KESWICK NW
3 KESWICK NE
4 WHAT CHEER SE
5 KESWICK SE
6 DELTA NE
7 SIGOURNEY NW
8 SIGOURNEY NE

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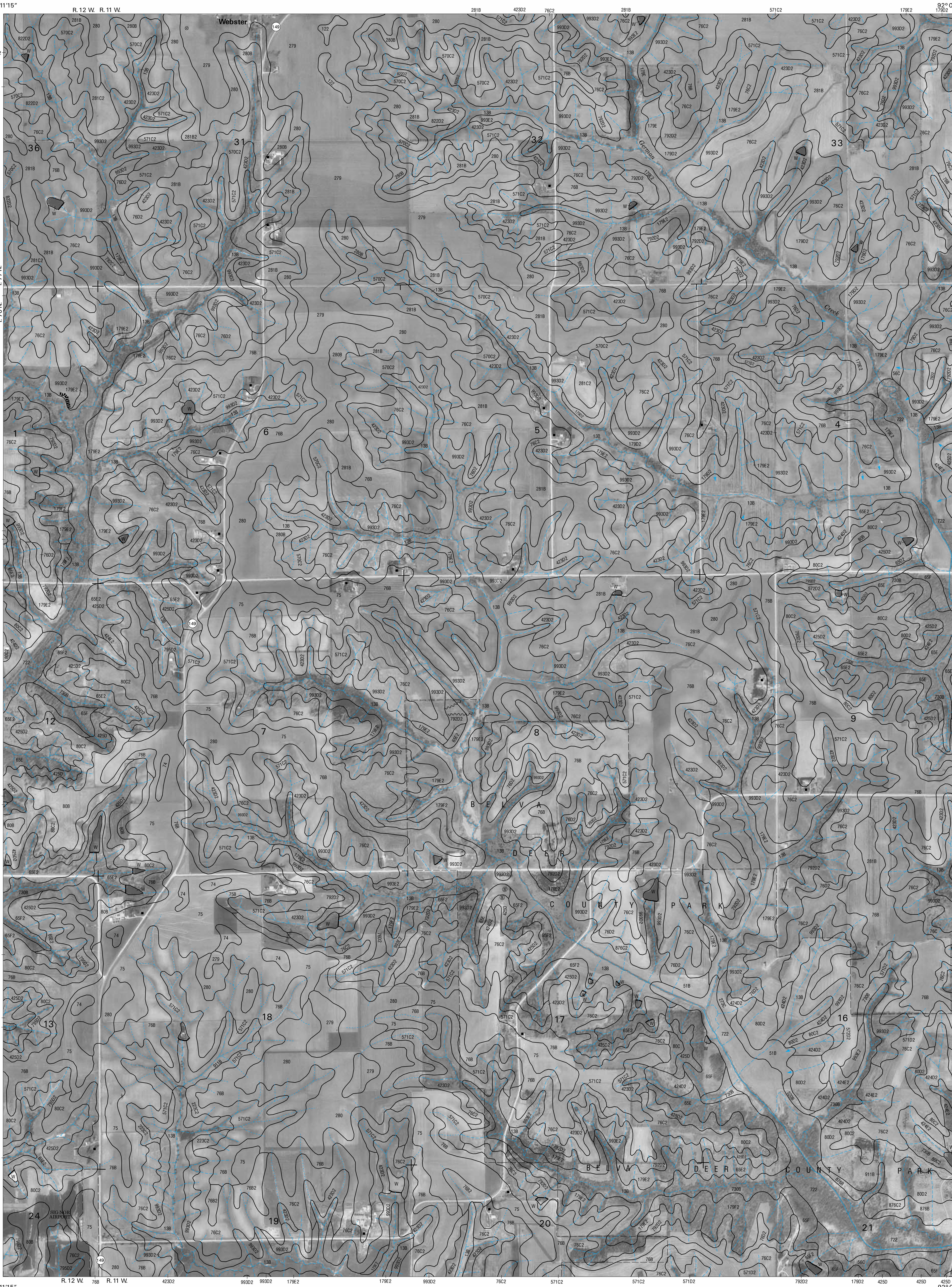
3.75 MINUTE SERIES
SHEET NUMBER 20 OF 56

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

(Joins sheet 13, Keswick NE)

92° 11′15″ R. 12 W. R. 11 W. 92° 07′30″
41° 26′15″ 41° 26′15″

(Joins sheet 20, Keswick SW)



(Joins sheet 22, South English SW)

41° 22′30″ R. 12 W. R. 11 W. 41° 22′30″
92° 11′15″ 92° 07′30″

(Joins sheet 29, Sigourney NE)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES: 0.5 0 0.5

FEET: 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS: 0.5 0 0.5

1	2	3
4		5
6	7	8

1 KESWICK NW
2 KESWICK NE
3 SOUTH ENGLISH NW
4 KESWICK SW
5 SOUTH ENGLISH SW
6 SIGOURNEY NW
7 SIGOURNEY NE
8 HARPER NW

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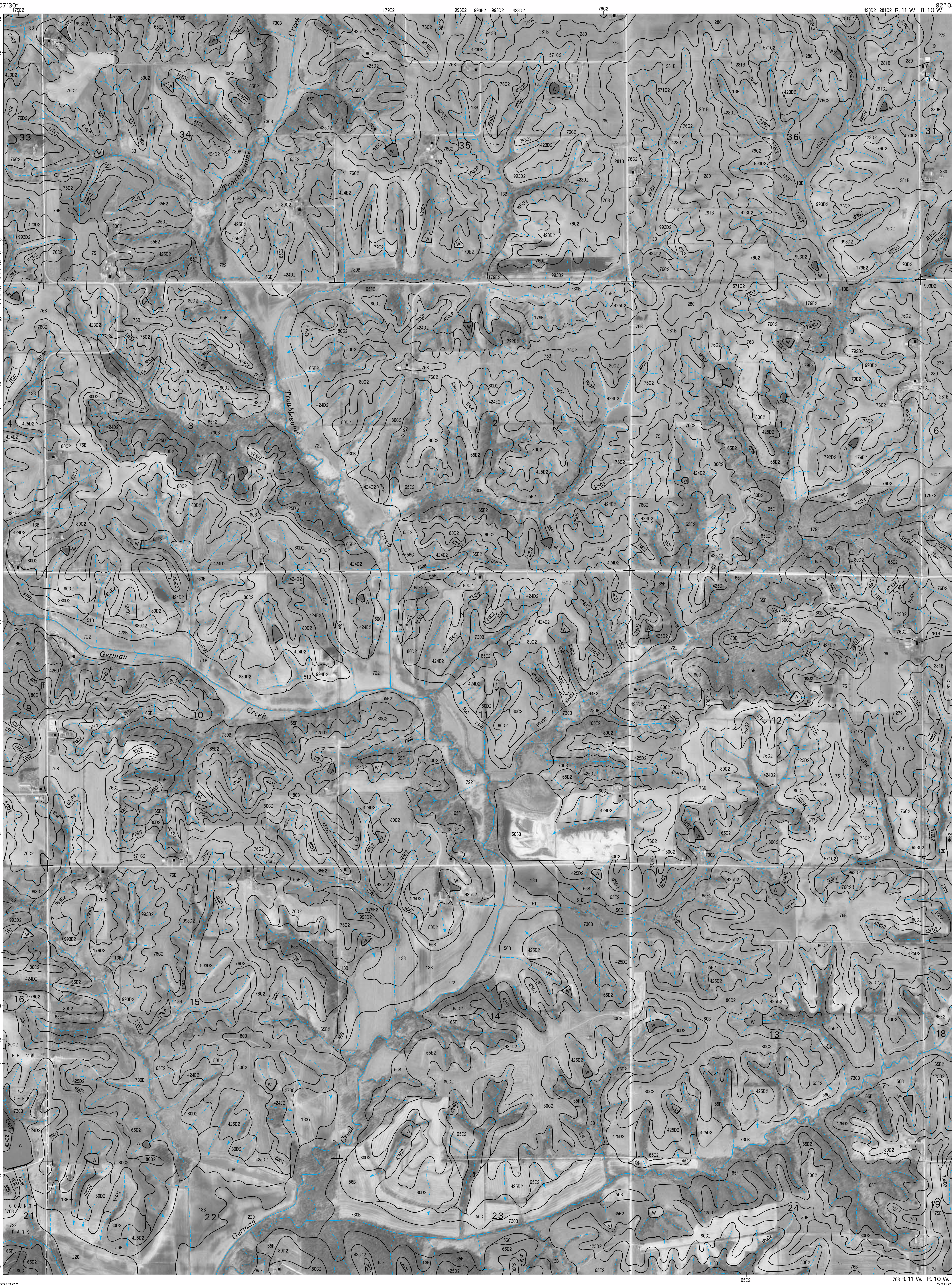
SHEET NUMBER 21 OF 56

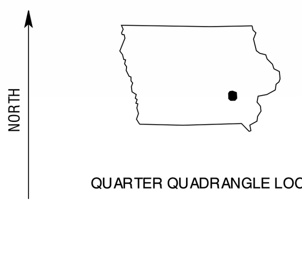
(Joins sheet 14, South English NW)



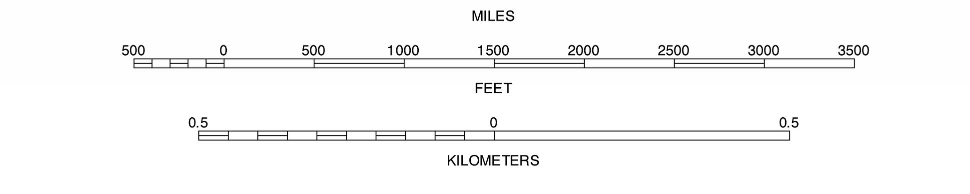
(Joins sheet 30, Harper NW)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.



SCALE 1:12000



1	2	3
4		5
6	7	8

1 KESWICK NE
2 SOUTH ENGLISH NW
3 SOUTH ENGLISH NE
4 KESWICK SE
5 SOUTH ENGLISH SE
6 SIGOURNEY NE
7 HARPER NW
8 HARPER NE

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KEOKUK COUNTY, IOWA
SOUTH ENGLISH SE QUADRANGLE
SHEET NUMBER 23 OF 56

(Joins sheet 15, South English NE)

92° 03′45″ 41° 26′15″ — 92° 00′00″ 41° 26′15″

41° 22′30″ 92° 03′45″ — 41° 22′30″ 92° 00′00″

(Joins sheet 22, South English SW)

(Joins sheet 24, Kinross SW)

(Joins sheet 31, Harper NE)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES: 0.5 0 0.5

FEET: 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS: 0.5 0 0.5

1	2	3
4		5
6	7	8

1 SOUTH ENGLISH NW
2 SOUTH ENGLISH NE
3 KINROSS NW
4 SOUTH ENGLISH SW
5 KINROSS SW
6 HARPER NW
7 HARPER NE
8 KEOTA NW

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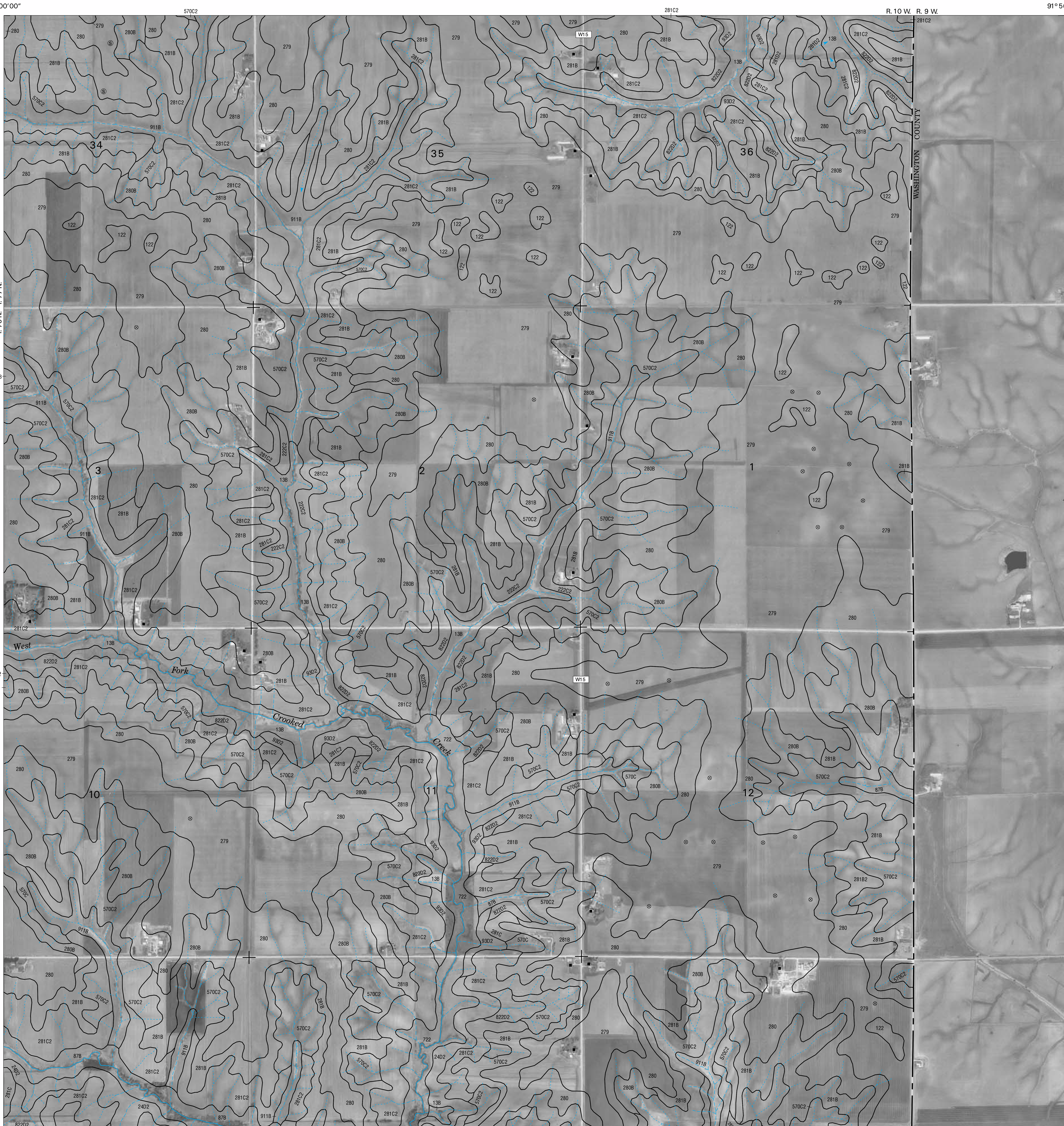
KEOKUK COUNTY, IOWA
KINROSS SW QUADRANGLE
SHEET NUMBER 24 OF 56

(Joins sheet 16, Kinross NW)

(Joins sheet 23, South English SE)

92° 00'00"   41° 26'15"   91° 56'15"   41° 26'15"



41° 22'30"   92° 00'00"   41° 22'30"   91° 56'15"

(Joins sheet 32, Keota NW)

SCALE 1:12000

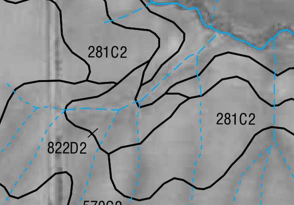
MILES 0.5 0 0.5

FEET 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS 0.5 0 0.5

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.



QUARTER QUADRANGLE LOCATION

1	2	3
4		5
6	7	8

1 SOUTH ENGLISH NE
2 KINROSS NW
3 KINROSS NE
4 SOUTH ENGLISH SE
5 KINROSS SE
6 HARPER NE
7 KEOTA NW
8 KEOTA NE

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KEOKUK COUNTY, IOWA
ROSE HILL NE QUADRANGLE
SHEET NUMBER 25 OF 56

(Joins sheet 17, Gibson SE)

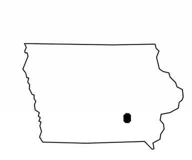
(Joins sheet 26, Delta NW)

(Joins sheet 33, Rose Hill SE)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 — 0 — MILES — 0.5

500 0 500 1000 1500 2000 2500 3000 3500 FEET

0.5 0 0.5 KILOMETERS

1	2	3
4		5
6	7	8

1 GIBSON SW
2 GIBSON SE
3 WHAT CHEER SW
4 ROSE HILL NW
5 DELTA NW
6 ROSE HILL SW
7 ROSE HILL SE
8 DELTA SW

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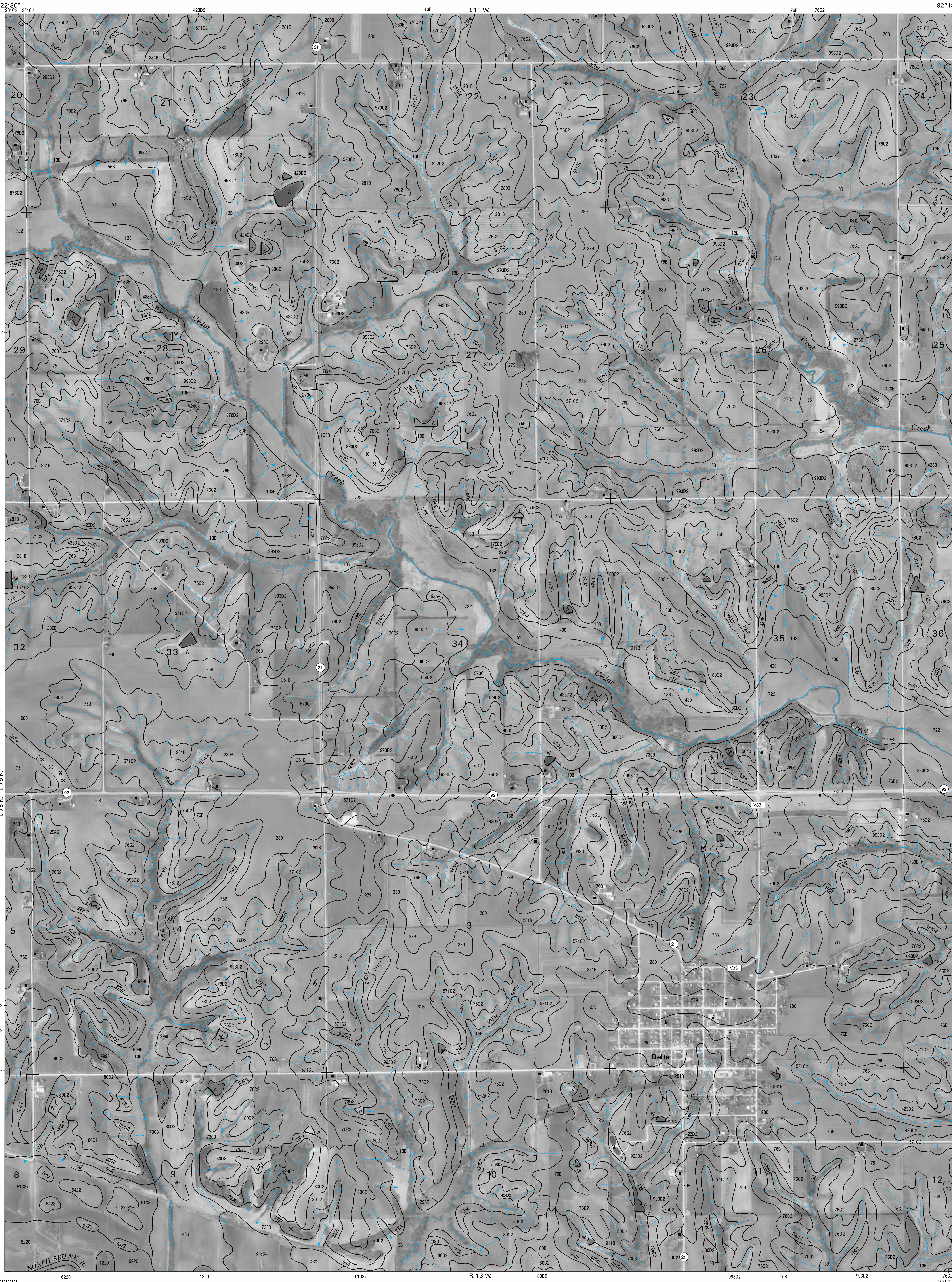
KEOKUK COUNTY, IOWA
DELTA NW QUADRANGLE
SHEET NUMBER 26 OF 56

(Joins sheet 18, What Cheer SW)

92°22'30"
41°22'30"

92°18'45"
41°22'30"



(Joins sheet 25, Rose Hill NE)

(Joins sheet 27, Delta NE)

41°18'45"
92°22'30"

41°18'45"
92°18'45"

(Joins sheet 34, Delta SW)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 15.
Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES: 0.5 0 0.5

FEET: 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS: 0.5 0 0.5

1	2	3
4		5
6	7	8

1 GIBSON SE
2 WHAT CHEER SW
3 WHAT CHEER SE
4 ROSE HILL NE
5 DELTA NE
6 ROSE HILL SE
7 DELTA SW
8 DELTA SE

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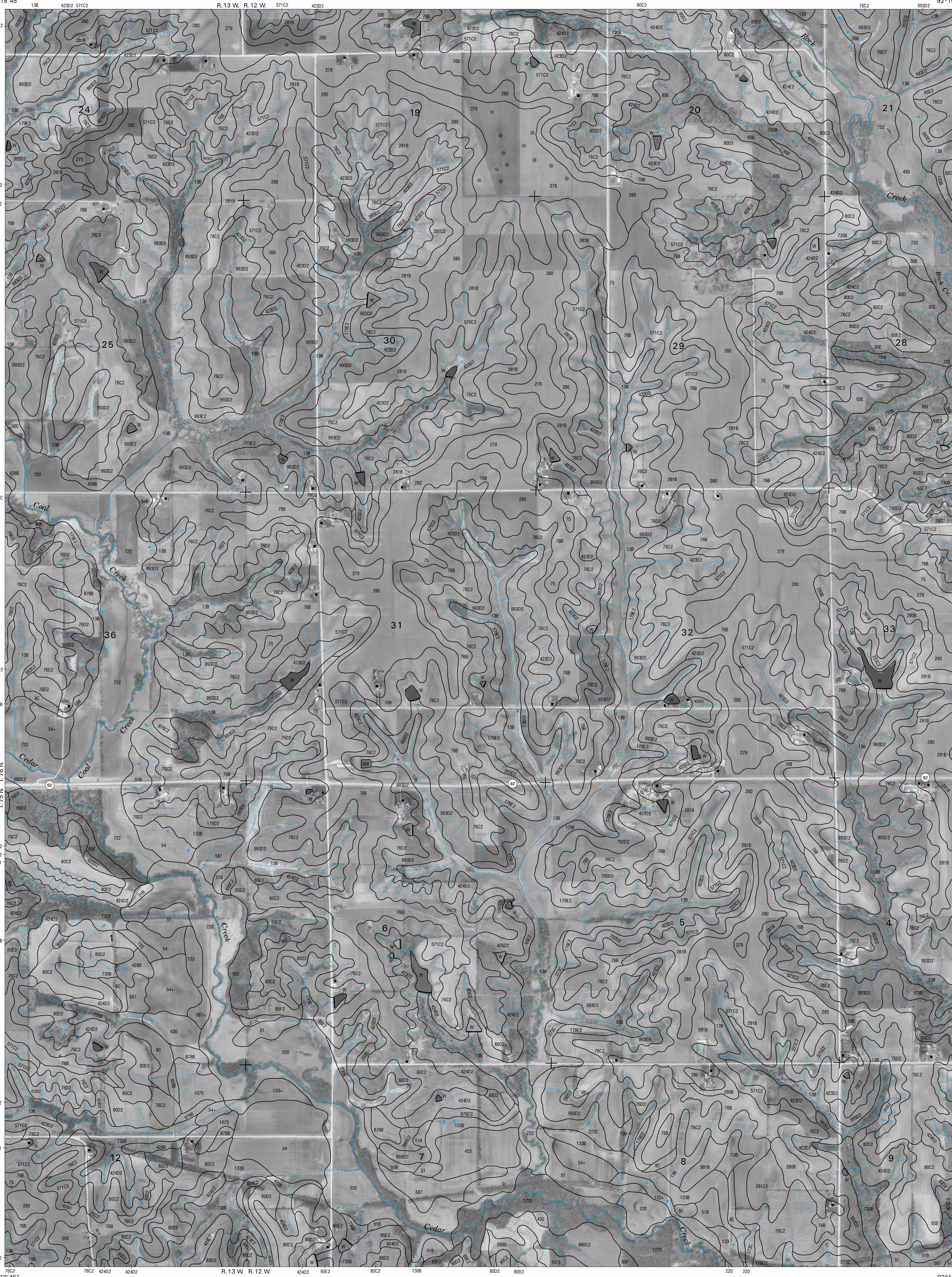
KEOKUK COUNTY, IOWA
DELTA NE QUADRANGLE
SHEET NUMBER 27 OF 56

(Joins sheet 19, What Cheer SE)

92°18′45″ 41°22′30″ — 92°15′00″ 41°22′30″



(Joins sheet 26, Delta NW)

(Joins sheet 28, Sigourney NW)

41°18′45″ 92°18′45″ — 41°18′45″ 92°15′00″

(Joins sheet 35, Delta SE)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 15.
Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES: 0.5 0 0.5

FEET: 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS: 0.5 0 0.5

1	2	3
4		5
6	7	8

1 WHAT CHEER SW
2 WHAT CHEER SE
3 KESWICK SW
4 DELTA NW
5 SIGOURNEY NW
6 DELTA SW
7 DELTA SE
8 SIGOURNEY SW

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KEOKUK COUNTY, IOWA
SIGOURNEY NW QUADRANGLE
SHEET NUMBER 28 OF 56

(Joins sheet 20, Keswick SW)

92°15'00" 41°22'30" — 92°11'15" 41°22'30"

(Joins sheet 27, Delta NE)

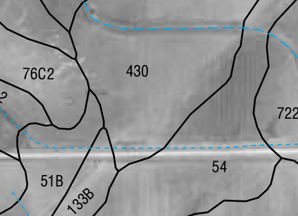
(Joins sheet 29, Sigourney NE)

41°18'45" 92°15'00" — 41°18'45" 92°11'15"

(Joins sheet 36, Sigourney SW)

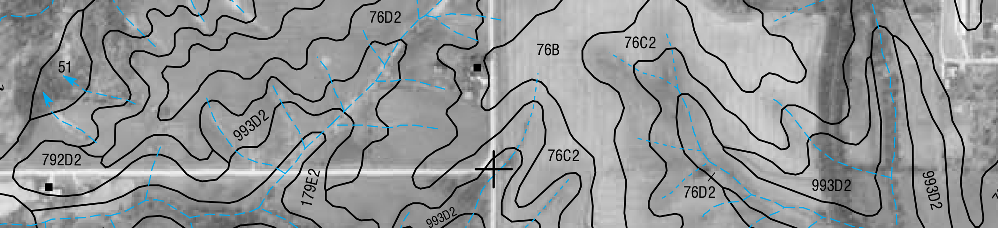
This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 15.
Coordinate grid ticks and land division data, if shown, are approximately positioned.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000



1	2	3
4		5
6	7	8

1 WHAT CHEER SE
2 KESWICK SW
3 KESWICK SE
4 DELTA NE
5 SIGOURNEY NE
6 DELTA SE
7 SIGOURNEY SW
8 SIGOURNEY SE

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DEPARTMENT OF AGRICULTURE
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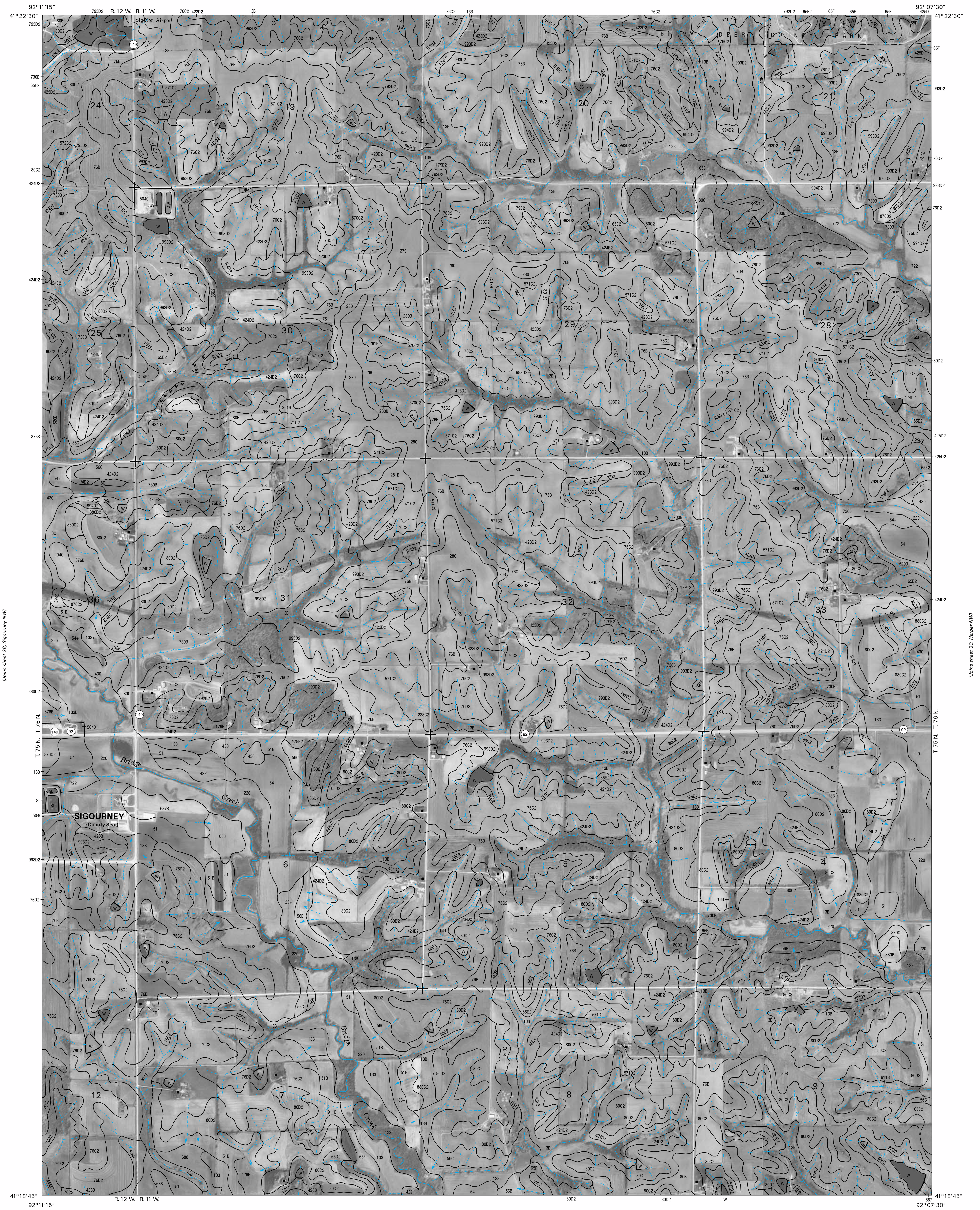
KEOKUK COUNTY, IOWA
SIGOURNEY NE QUADRANGLE
SHEET NUMBER 29 OF 56

(Joins sheet 21, Keswick SE)



(Joins sheet 37, Sigourney SE)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 15.
Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES: 0.5 0 0.5

FEET: 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS: 0.5 0 0.5

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1 KESWICK SW
2 KESWICK SE
3 SOUTH ENGLISH SW
4 SIGOURNEY NW
5 HARPER NW
6 SIGOURNEY SW
7 SIGOURNEY SE
8 HARPER SW

SIGOURNEY NE, IOWA
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DEPARTMENT OF AGRICULTURE
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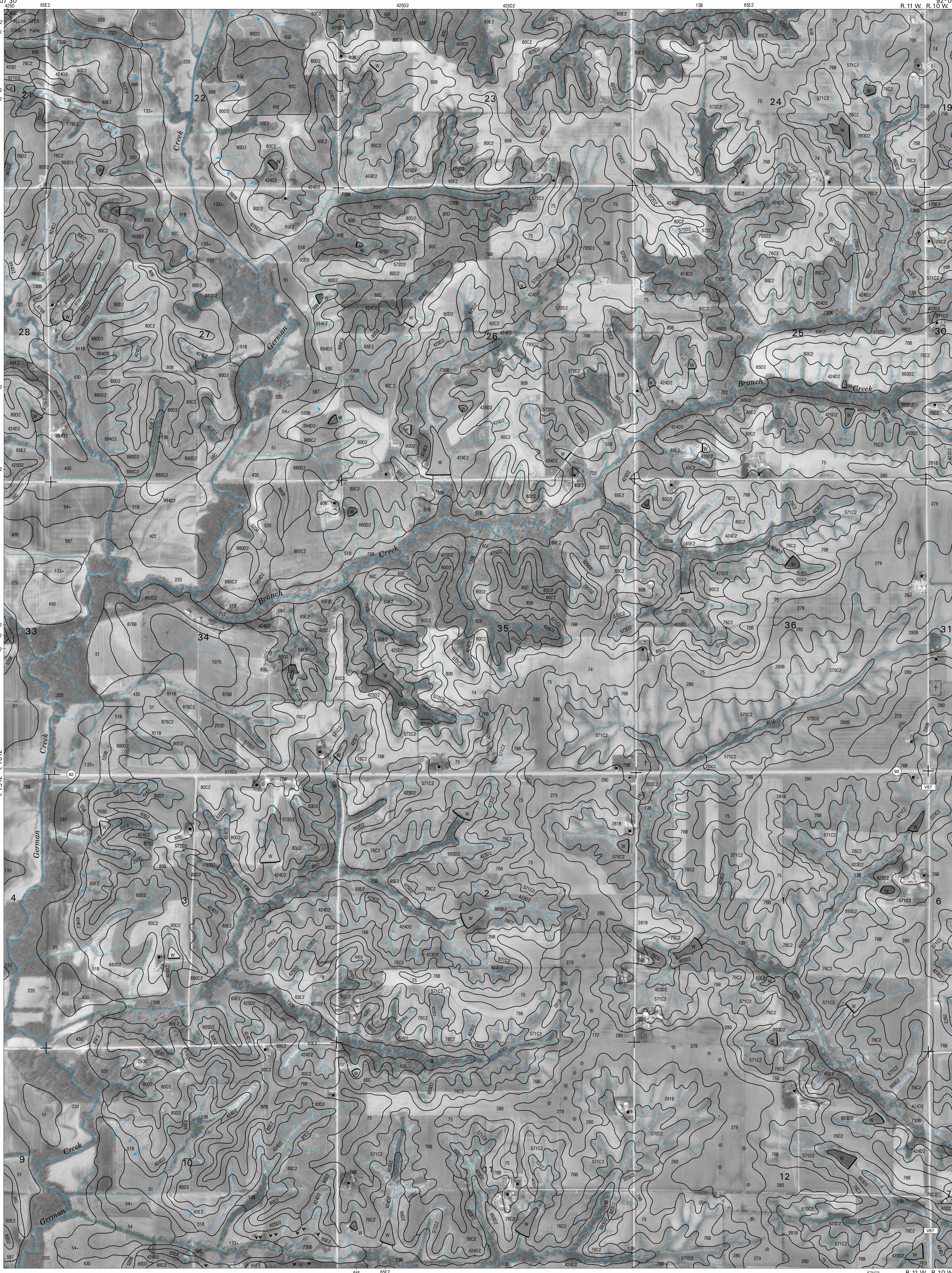
KEOKUK COUNTY, IOWA
HARPER NW QUADRANGLE
SHEET NUMBER 30 OF 56

(Joins sheet 22, South English SW)

92° 07′30″
41° 22′30″

92° 03′45″
41° 22′30″

R. 11 W. R. 10 W.



(Joins sheet 29, Sigourney NE)

(Joins sheet 31, Harper NE)

T. 76 N.
T. 75 N.

41° 18′45″
92° 07′30″

R. 11 W. R. 10 W.
41° 18′45″
92° 03′45″

(Joins sheet 38, Harper SW)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 KESWICK SE
2 SOUTH ENGLISH SW
3 SOUTH ENGLISH SE
4 SIGOURNEY NE
5 HARPER NE
6 SIGOURNEY SE
7 HARPER SW
8 HARPER SE

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DEPARTMENT OF AGRICULTURE
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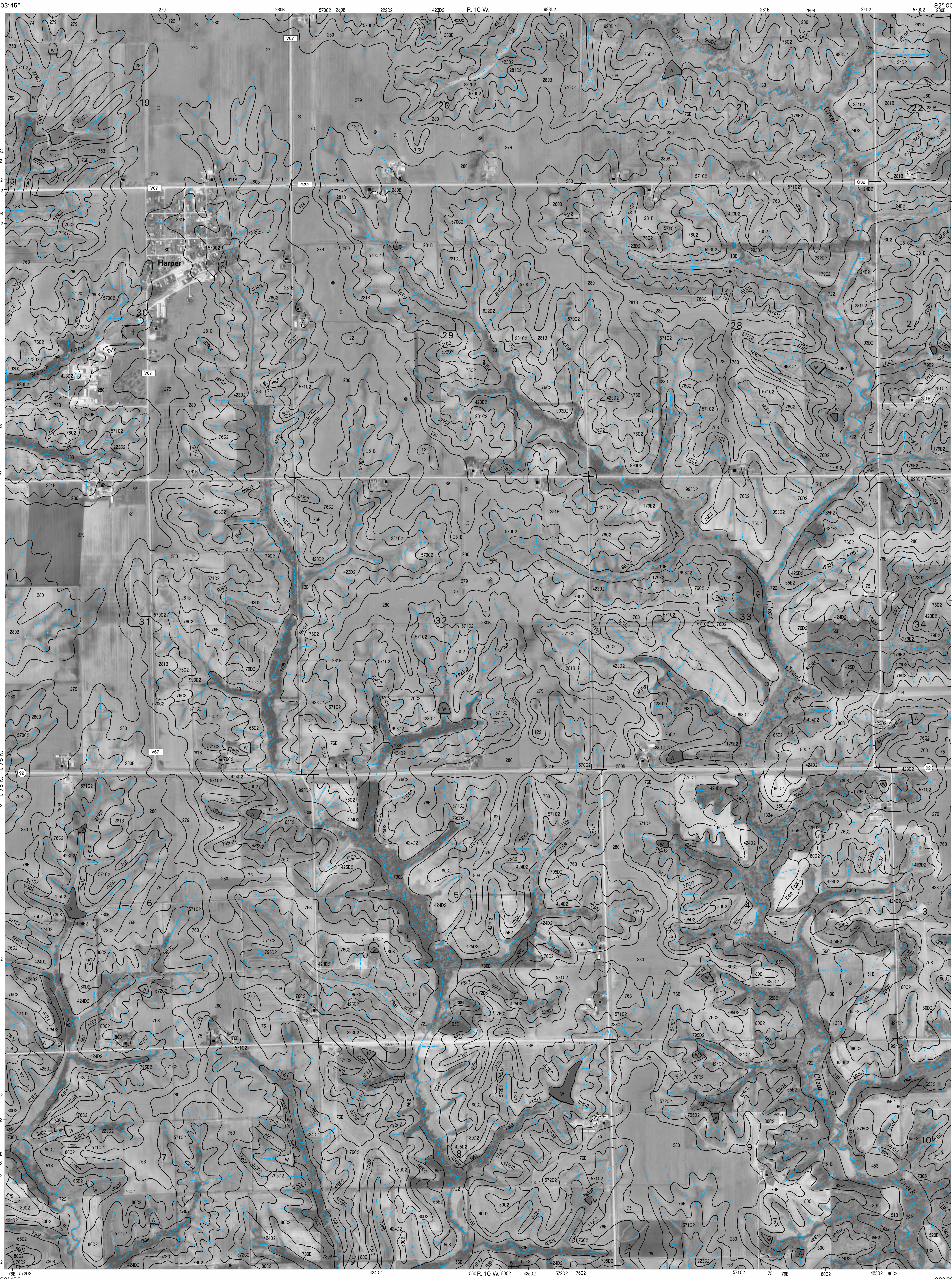
KEOKUK COUNTY, IOWA
HARPER NE QUADRANGLE
SHEET NUMBER 31 OF 56

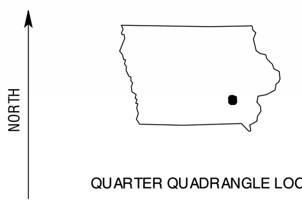
(Joins sheet 23, South English SE)

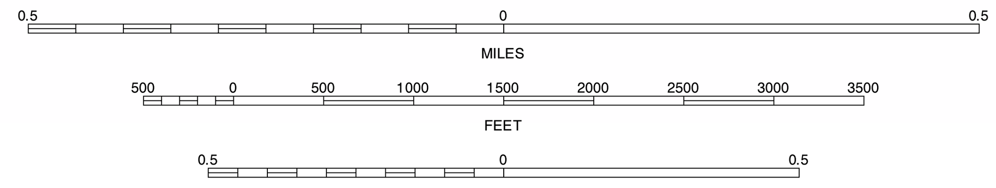


(Joins sheet 39, Harper SE)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 15.
Coordinate grid ticks and land division data, if shown, are approximately positioned.





1	2	3
4		5
6	7	8

1 SOUTH ENGLISH SW
2 SOUTH ENGLISH SE
3 KINROSS SW
4 HARPER NW
5 KEOTA NW
6 HARPER SW
7 HARPER SE
8 KEOTA SW

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SHEET NUMBER 31 OF 56

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

KEOKUK COUNTY, IOWA
KEOTA NW QUADRANGLE
SHEET NUMBER 32 OF 56

(Joins sheet 24, Kinross SW)

92° 00'00"
41° 22'30"

91° 56'15"
41° 22'30"

(Joins sheet 31, Harper NE)

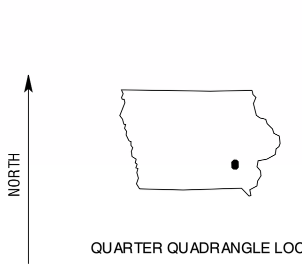
41° 18'45"
92° 00'00"

41° 18'45"
91° 56'15"

(Joins sheet 40, Keota SW)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES: 0.5 0 0.5

FEET: 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS: 0.5 0 0.5

1	2	3
4		5
6	7	8

1 SOUTH ENGLISH SE
2 KINROSS SW
3 KINROSS SE
4 HARPER NE
5 KEOTA NE
6 HARPER SE
7 KEOTA SW
8 KEOTA SE

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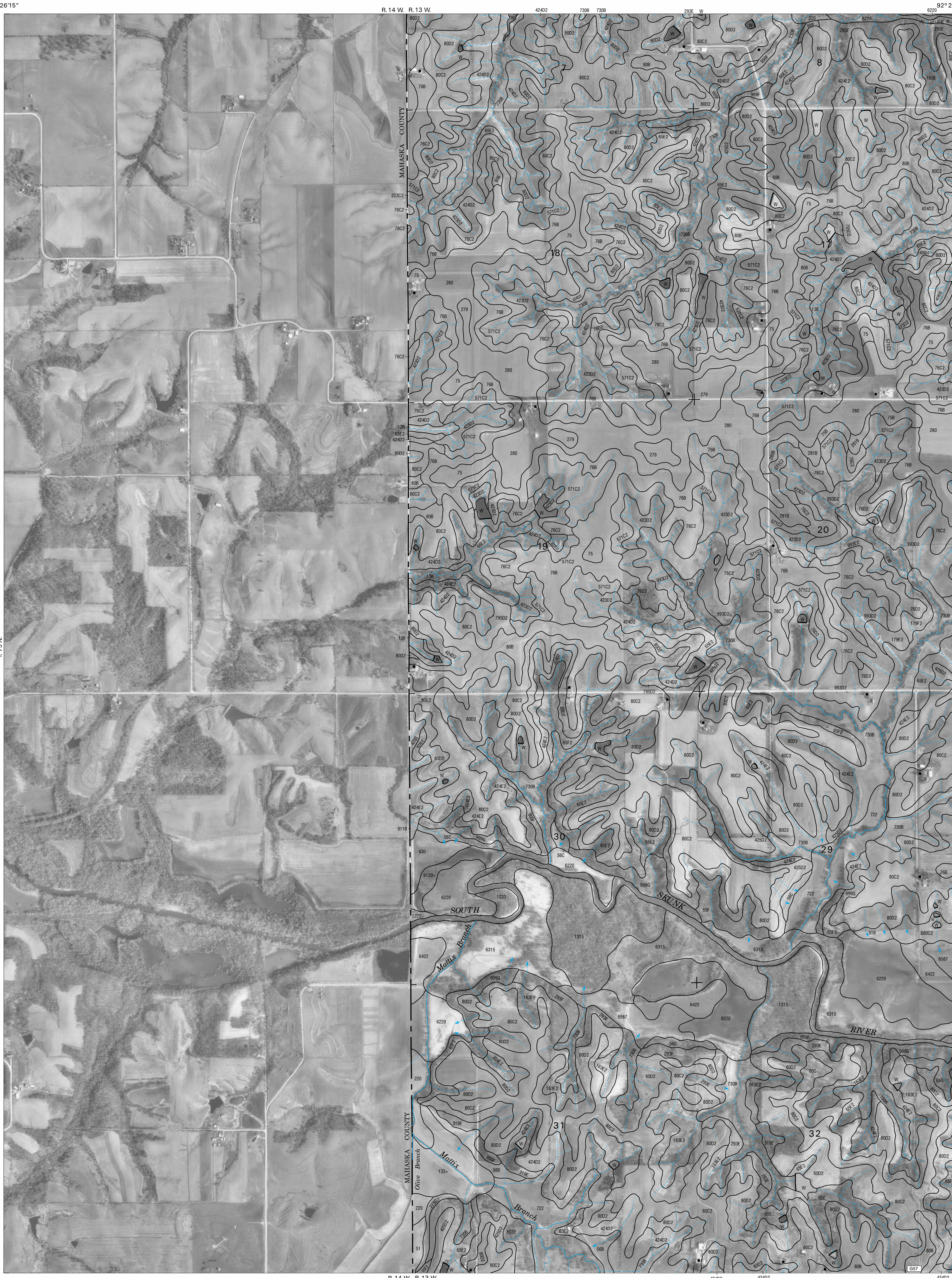
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

KEOKUK COUNTY, IOWA
ROSE HILL SE QUADRANGLE
SHEET NUMBER 33 OF 56

(Joins sheet 25, Rose Hill NE)

92° 26′15″ 41°18′45″ R. 14 W. R. 13 W. 92° 22′30″ 41°18′45″



(Joins sheet 34, Delta SW)

41°15′00″ 92° 26′15″ R. 14 W. R. 13 W. 41°15′00″ 92° 22′30″

(Joins sheet 41, Fremont NE)

SCALE 1:12000

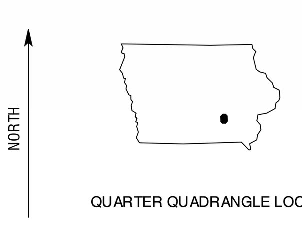
0.5 0 0.5 MILES

500 0 500 1000 1500 2000 2500 3000 3500 FEET

0.5 0 0.5 KILOMETERS

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.



QUARTER QUADRANGLE LOCATION

1	2	3
4		5
6	7	8

1 ROSE HILL NW
2 ROSE HILL NE
3 DELTA NW
4 ROSE HILL SW
5 DELTA SW
6 FREMONT NW
7 FREMONT NE
8 HEDRICK NW

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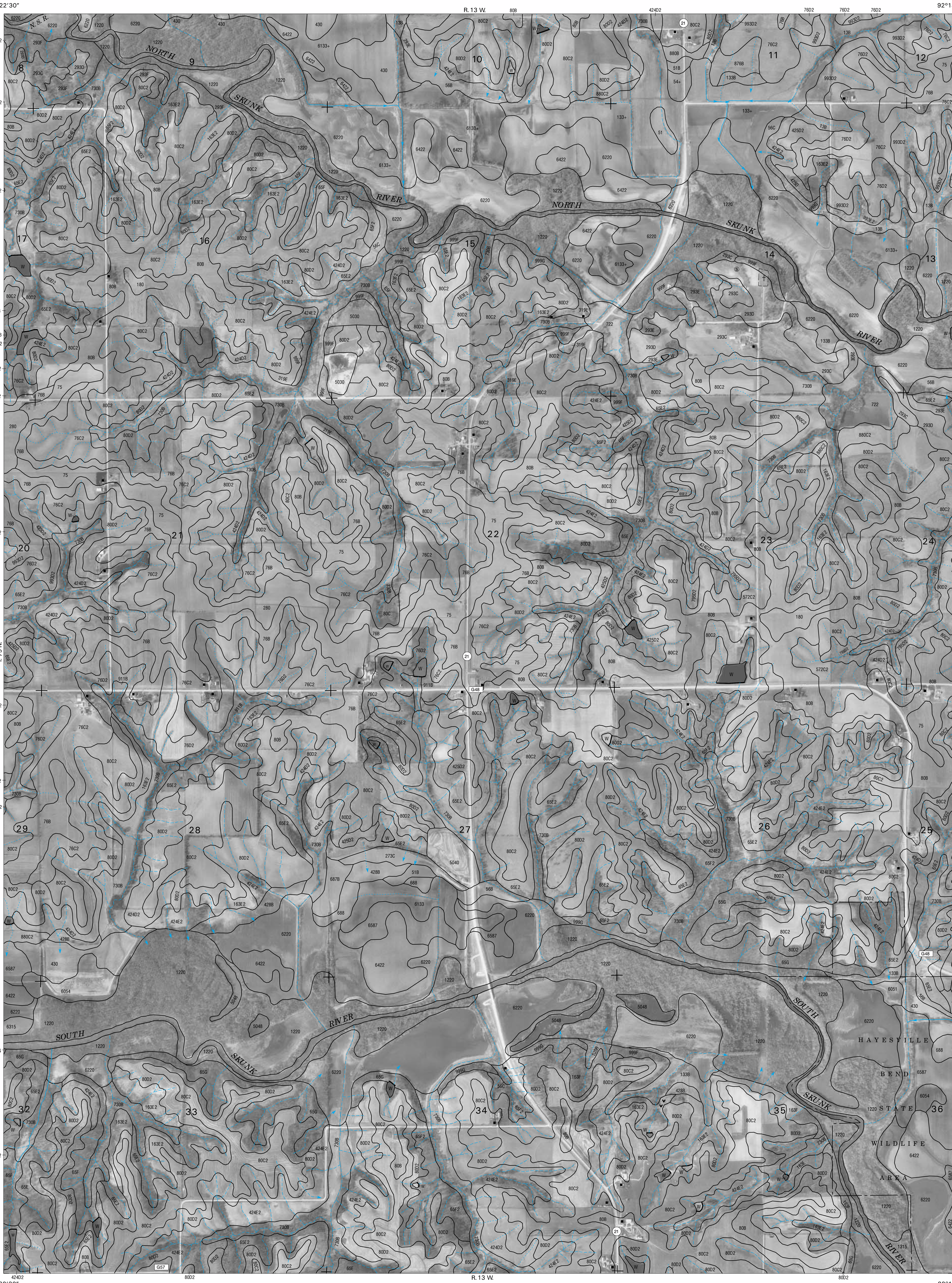
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

KEOKUK COUNTY, IOWA
DELTA SW QUADRANGLE
SHEET NUMBER 34 OF 56

(Joins sheet 26, Delta NW)

92° 22' 30" 41° 18' 45"

92° 18' 45" 41° 18' 45"



(Joins sheet 33, Rose Hill SE)

(Joins sheet 35, Delta SE)

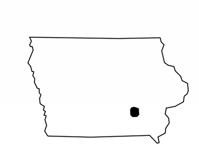
41° 15' 00" 92° 22' 30"

41° 15' 00" 92° 18' 45"

(Joins sheet 42, Hedrick NW)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 15.
Coordinate grid ticks and land division data, if shown, are approximately positioned.



NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES: 0.5 0 0.5

FEET: 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS: 0.5 0 0.5

1 ROSE HILL NE
2 DELTA NW
3 DELTA NE
4 ROSE HILL SE
5 DELTA SE
6 FREMONT NE
7 HEDRICK NW
8 HEDRICK NE

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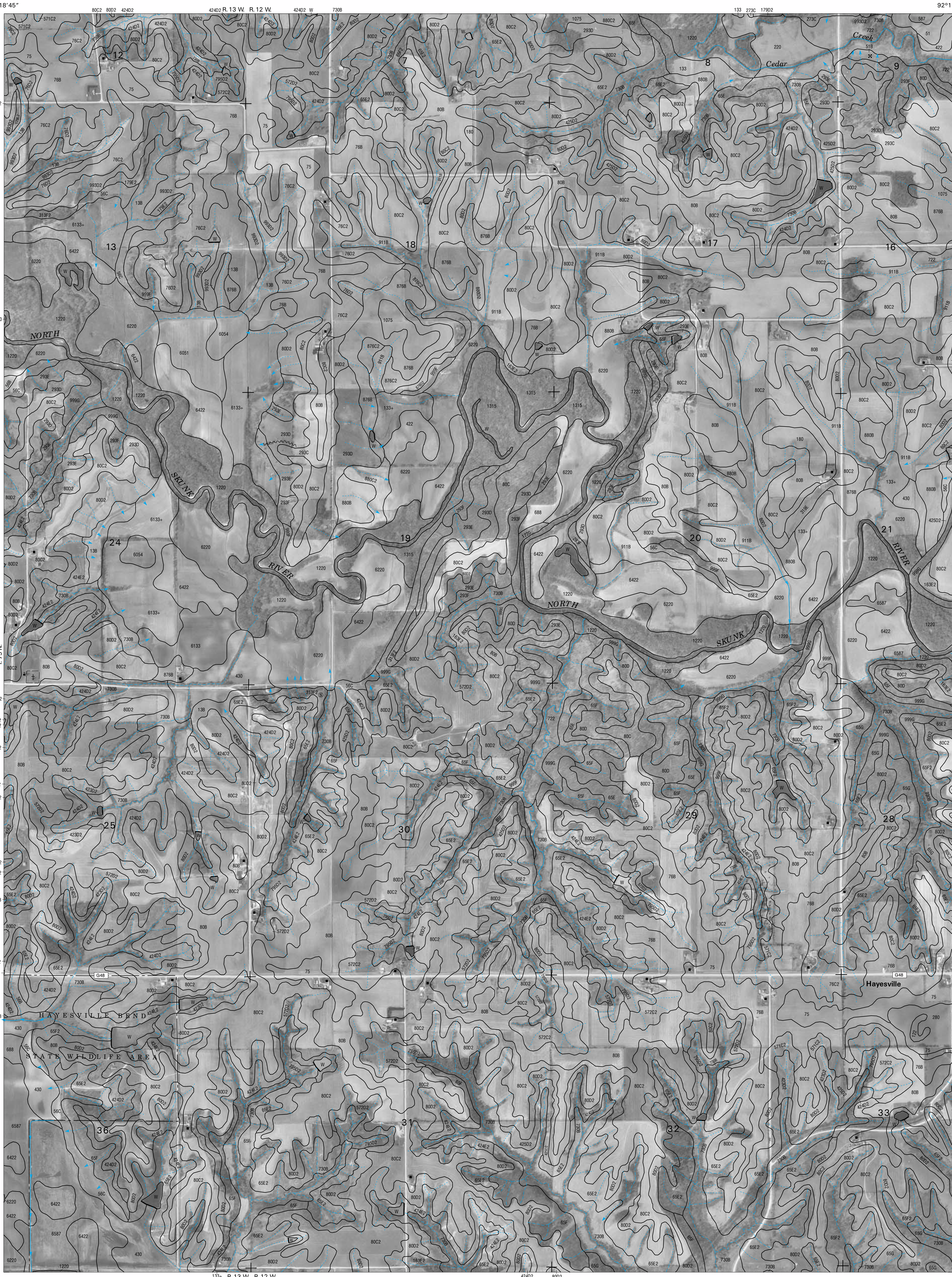
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

KEOKUK COUNTY, IOWA
DELTA SE QUADRANGLE
SHEET NUMBER 35 OF 56

(Joins sheet 27, Delta NE)



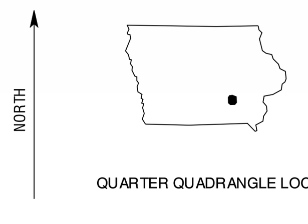
(Joins sheet 34, Delta SW)

(Joins sheet 36, Sigourney SW)

(Joins sheet 43, Hedrick NE)

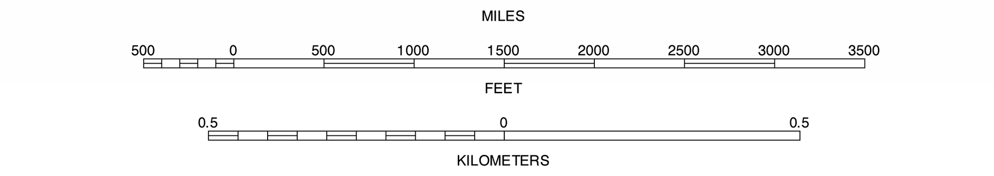
This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000



1	2	3
4		5
6	7	8

1 DELTA NW
2 DELTA NE
3 SIGOURNEY NW
4 DELTA SW
5 SIGOURNEY SW
6 HEDRICK NW
7 HEDRICK NE
8 PEKIN NW

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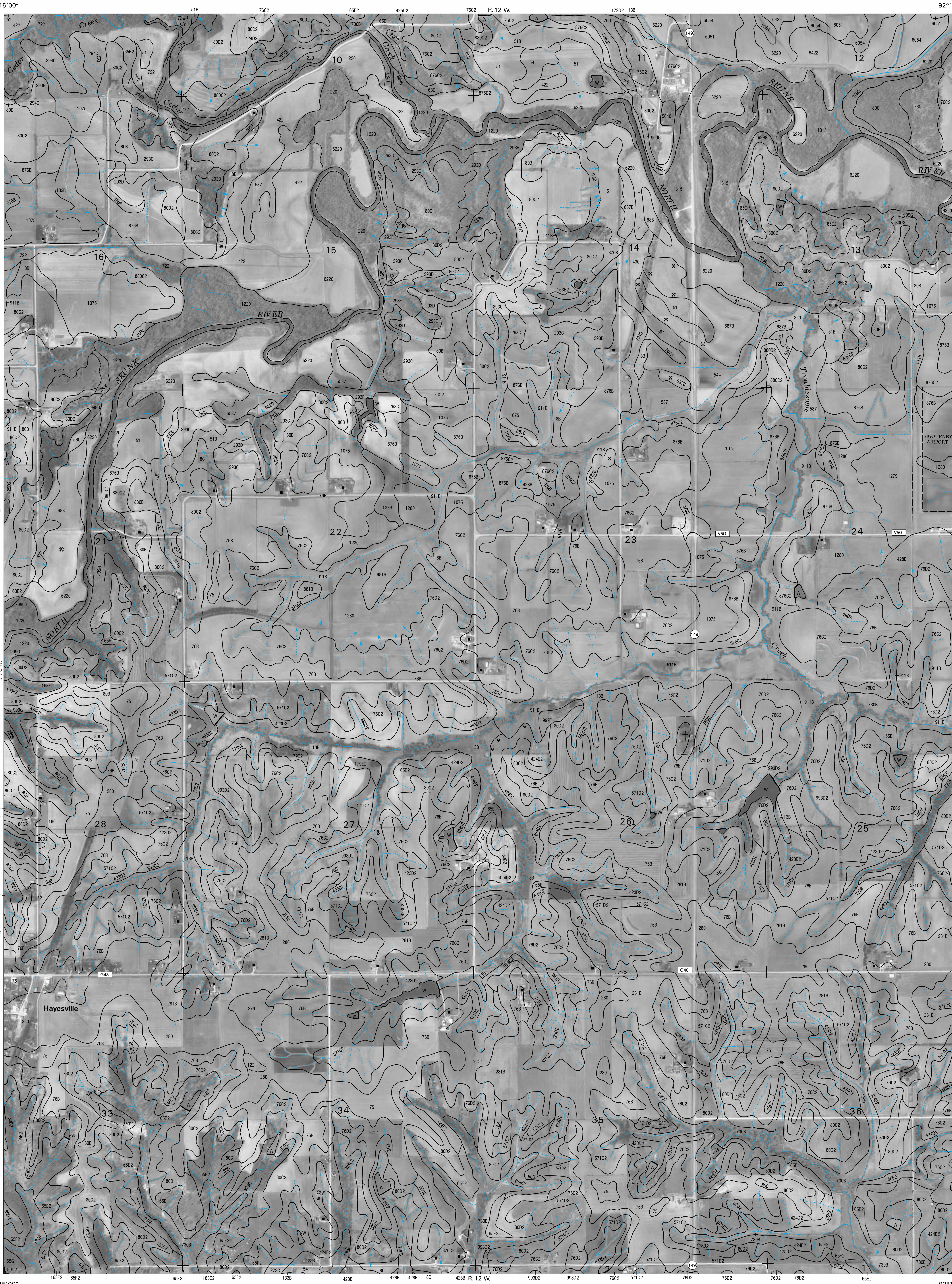
KEOKUK COUNTY, IOWA
SIGOURNEY SW QUADRANGLE
SHEET NUMBER 36 OF 56

(Joins sheet 28, Sigourney NW)

92°15'00" 41°18'45"

92°11'15" 41°18'45"



(Joins sheet 35, Delta SE)

(Joins sheet 37, Sigourney SE)

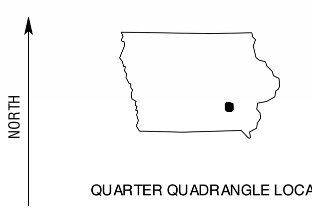
41°15'00" 92°15'00"

41°15'00" 92°11'15"

(Joins sheet 44, Pekin NW)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES: 0.5 0 0.5

FEET: 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS: 0.5 0 0.5

1	2	3
4		5
6	7	8

1 DELTA NE
2 SIGOURNEY NW
3 SIGOURNEY NE
4 DELTA SE
5 SIGOURNEY SE
6 HEDRICK NE
7 PEKIN NW
8 PEKIN NE

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UNITED STATES
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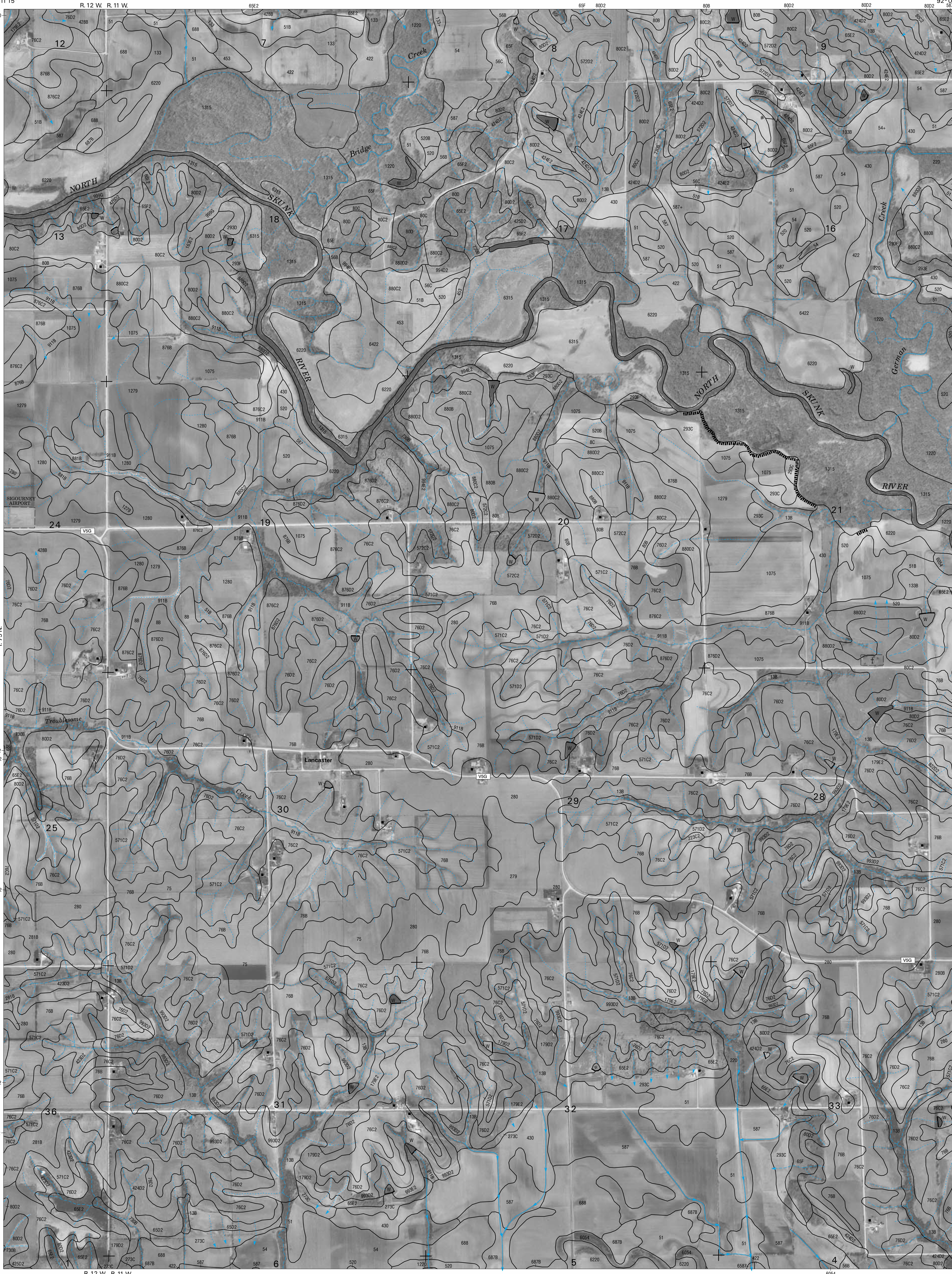
KEOKUK COUNTY, IOWA
SIGOURNEY SE QUADRANGLE
SHEET NUMBER 37 OF 56

(Joins sheet 29, Sigourney NE)

92°11′15″ 41°18′45″ — 92°07′30″ 41°18′45″

R. 12 W. R. 11 W.

(Joins sheet 36, Sigourney SW)



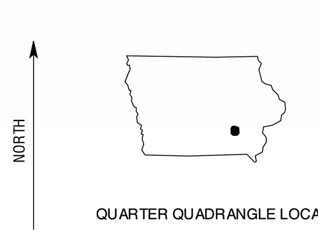
(Joins sheet 38, Harper SW)

41°15′00″ 92°11′15″ — 41°15′00″ 92°07′30″

R. 12 W. R. 11 W.

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.



QUARTER QUADRANGLE LOCATION

(Joins sheet 45, Pekin NE)

SCALE 1:12000

MILES: 0.5 — 0 — 0.5

FEET: 500 — 0 — 500 — 1000 — 1500 — 2000 — 2500 — 3000 — 3500

KILOMETERS: 0.5 — 0 — 0.5

1	2	3
4		5
6	7	8

1 SIGOURNEY NW
2 SIGOURNEY NE
3 HARPER NW
4 SIGOURNEY SW
5 HARPER SW
6 PEKIN NW
7 PEKIN NE
8 OLLIE NW

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UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

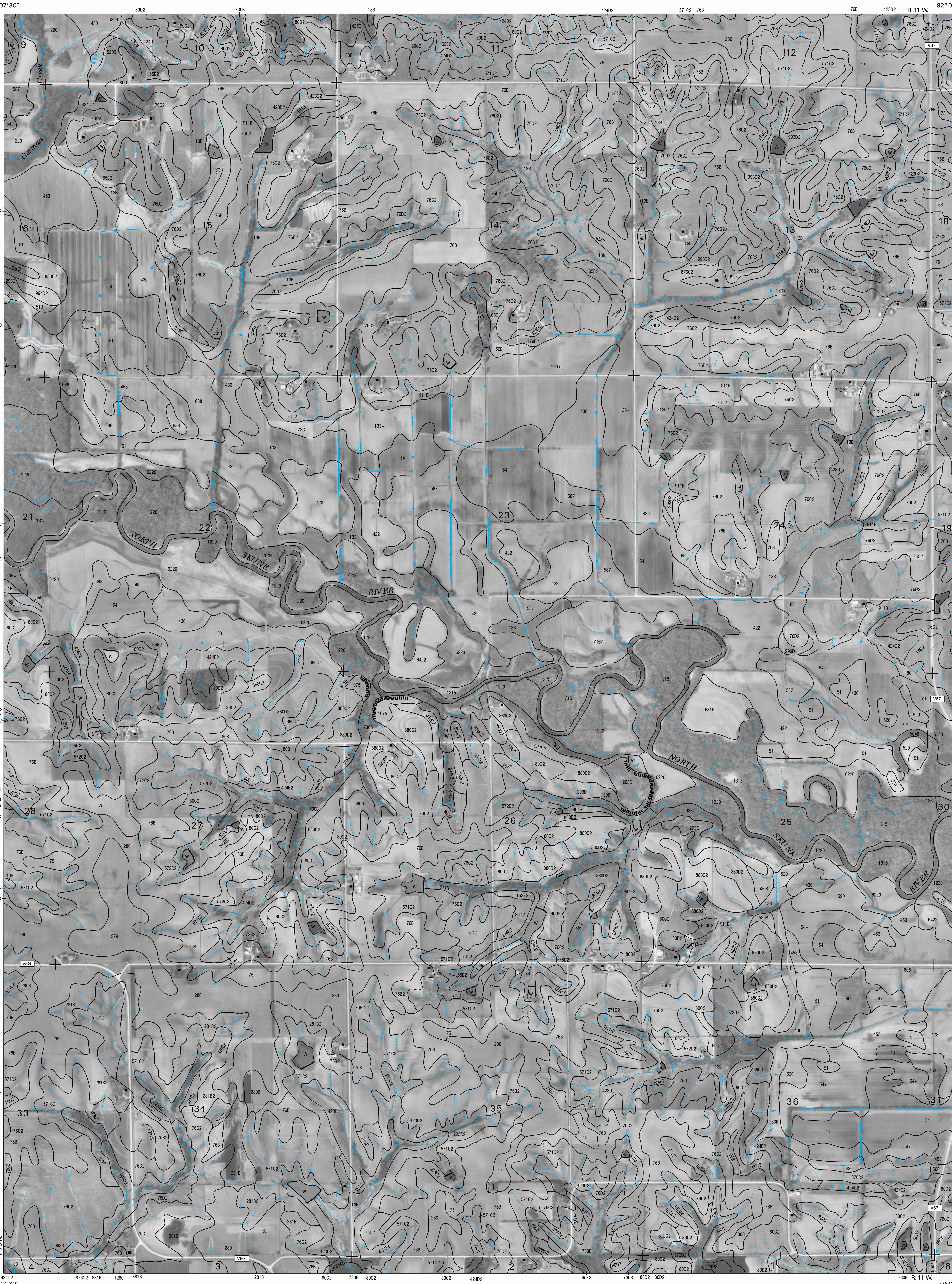
KEOKUK COUNTY, IOWA
HARPER SW QUADRANGLE
SHEET NUMBER 38 OF 56

(Joins sheet 30, Harper NW)

92° 07′30″ 41°18′45″ — 92° 03′45″ 41°18′45″ — R. 11 W.

(Joins sheet 37, Sigourney SE)

(Joins sheet 39, Harper SE)



41°15′00″ 92° 07′30″ — 41°15′00″ 92° 03′45″

(Joins sheet 46, Ollie NW)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 15.
Coordinate grid ticks and land division data, if shown, are approximately positioned.

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES: 0.5 — 0 — 0.5

FEET: 500 — 0 — 500 — 1000 — 1500 — 2000 — 2500 — 3000 — 3500

KILOMETERS: 0.5 — 0 — 0.5

1	2	3
4		5
6	7	8

1 SIGOURNEY NE
2 HARPER NW
3 HARPER NE
4 SIGOURNEY SE
5 HARPER SE
6 PEKIN NE
7 OLLIE NW
8 OLLIE NE

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UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

KEOKUK COUNTY, IOWA
HARPER SE QUADRANGLE
SHEET NUMBER 39 OF 56

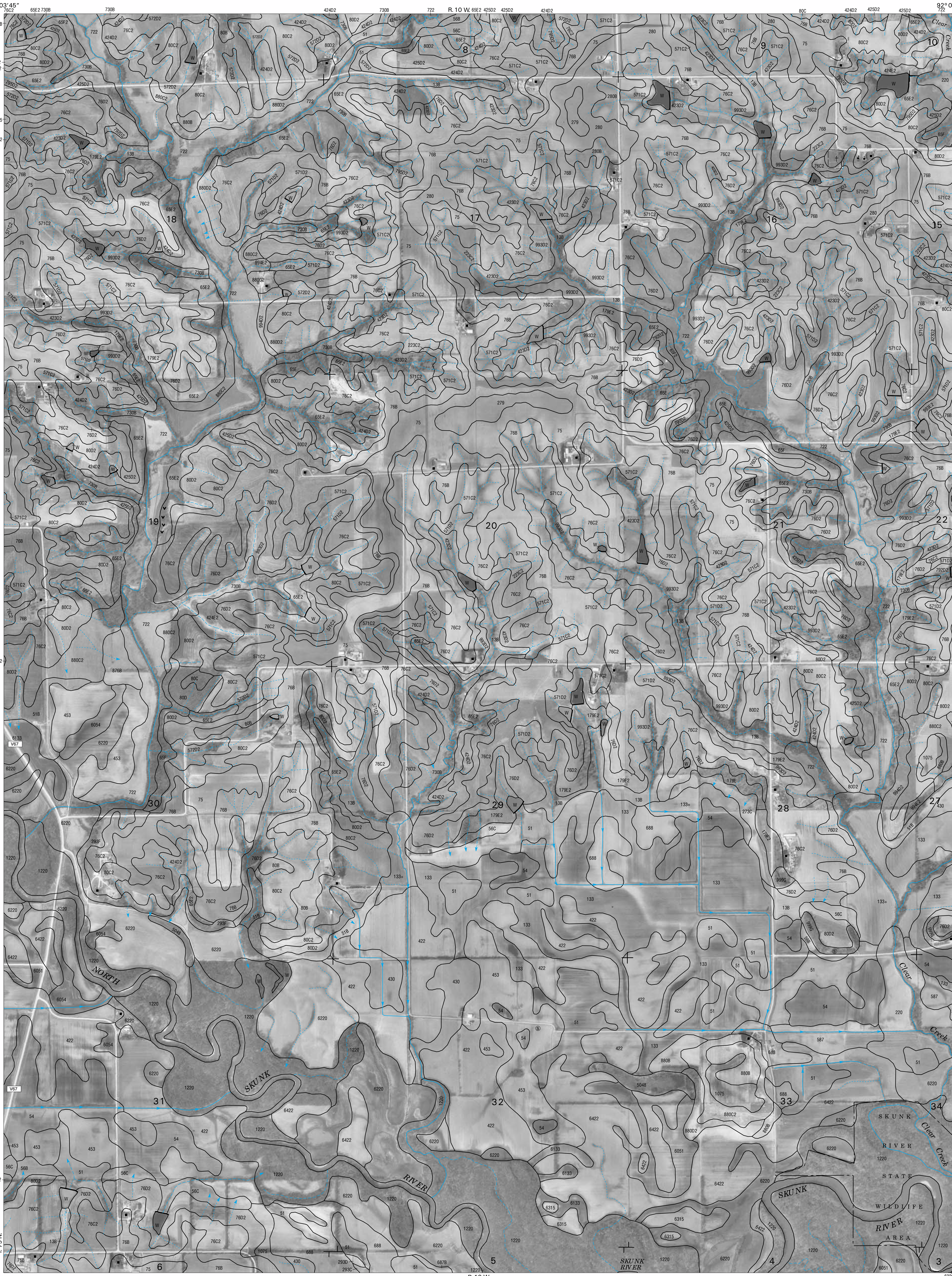
(Joins sheet 31, Harper NE)

92° 03′ 45″ 41° 18′ 45″

92° 00′ 00″ 41° 18′ 45″

(Joins sheet 38, Harper SW)

(Joins sheet 40, Keota SW)



41° 15′ 00″ 92° 03′ 45″

41° 15′ 00″ 92° 00′ 00″

R. 10 W.

(Joins sheet 47, Ollie NE)

SCALE 1:12000

MILES

FEET

KILOMETERS

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH

QUARTER QUADRANGLE LOCATION

1 HARPER NW
2 HARPER NE
3 KEOTA NW
4 HARPER SW
5 KEOTA SW
6 OLLIE NW
7 OLLIE NE
8 RICHLAND NW

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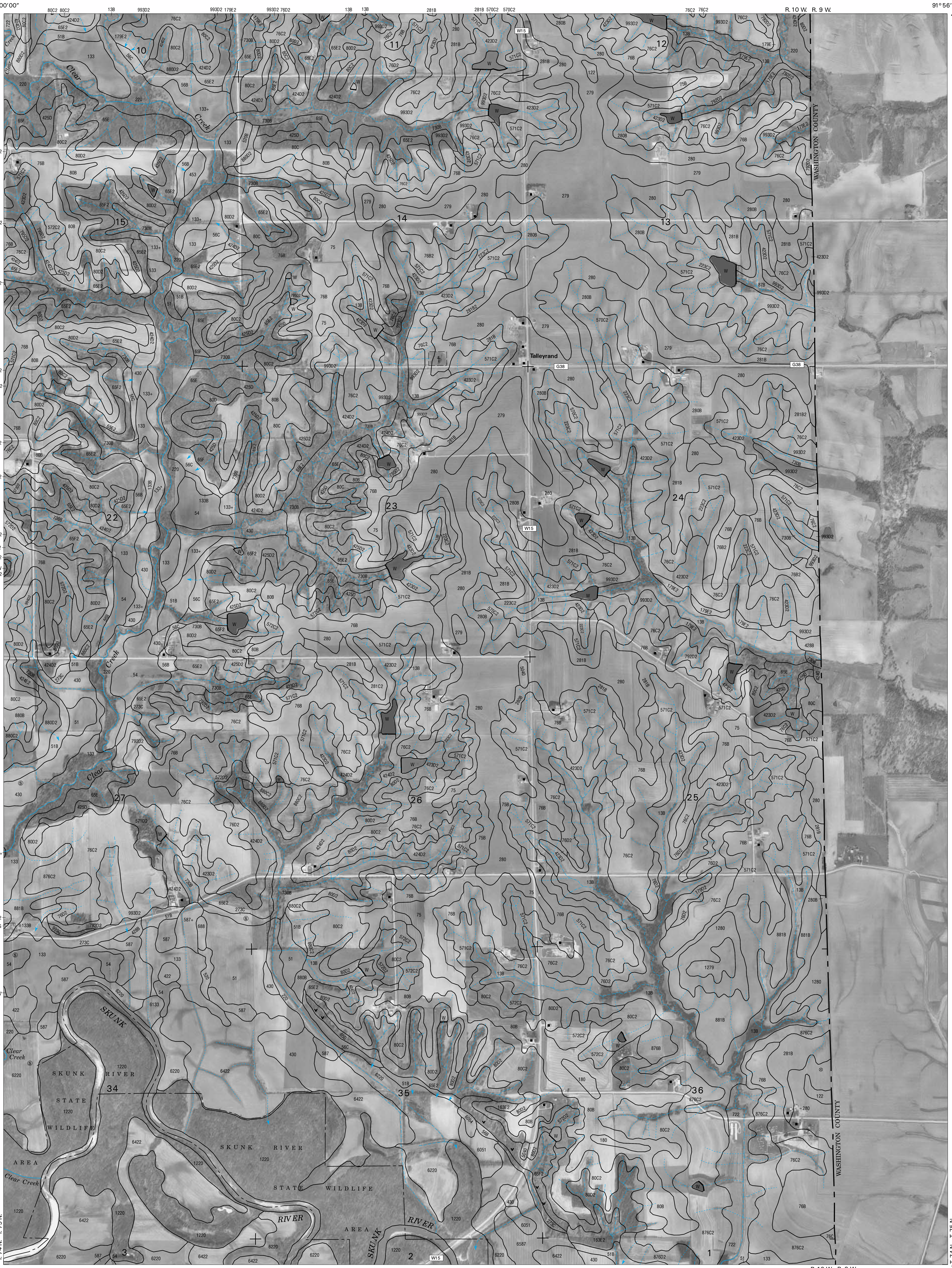
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

KEOKUK COUNTY, IOWA
KEOTA SW QUADRANGLE
SHEET NUMBER 40 OF 56

(Joins sheet 32, Keota NW)

92° 00′00″ 41° 18′45″ — 91° 56′15″ 41° 18′45″



(Joins sheet 39, Harper SE)

41° 15′00″ 92° 00′00″ — R. 10 W. R. 9 W. — 91° 56′15″ 41° 15′00″

(Joins sheet 48, Richland NW)

SCALE 1:12000

0.5 0 0.5 MILES

500 0 500 1000 1500 2000 2500 3000 3500 FEET

0.5 0 0.5 KILOMETERS

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH

QUARTER QUADRANGLE LOCATION

1	2	3
4		5
6	7	8

1 HARPER NE
2 KEOTA NW
3 KEOTA NE
4 HARPER SE
5 KEOTA SE
6 OLLIE NE
7 RICHLAND NW
8 RICHLAND NE

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UNITED STATES
DEPARTMENT OF AGRICULTURE
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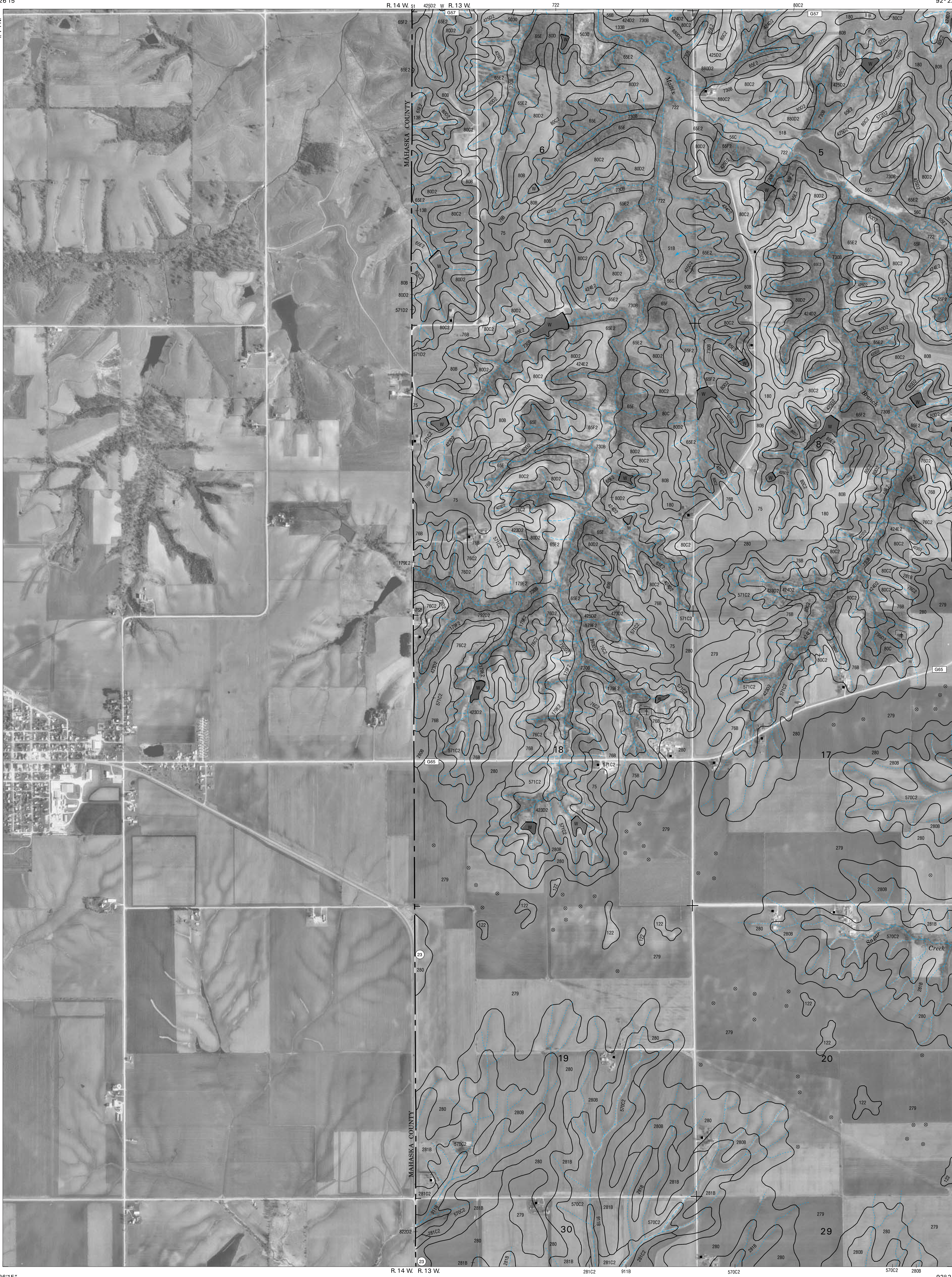
KEOKUK COUNTY, IOWA
FREMONT NE QUADRANGLE
SHEET NUMBER 41 OF 56

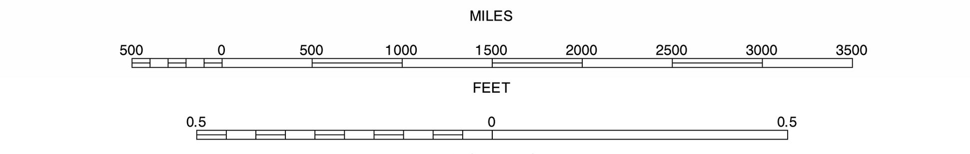
(Joins sheet 33, Rose Hill SE)



(Joins sheet 42, Hedrick NW)

(Joins sheet 49, Fremont SE)

SCALE 1:12000



This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 15.
Coordinate grid ticks and land division data, if shown, are approximately positioned.

QUARTER QUADRANGLE LOCATION

1	2	3
4		5
6	7	8

1 ROSE HILL SW
2 ROSE HILL SE
3 DELTA SW
4 FREMONT NW
5 HEDRICK NW
6 FREMONT SW
7 FREMONT SE
8 HEDRICK SW

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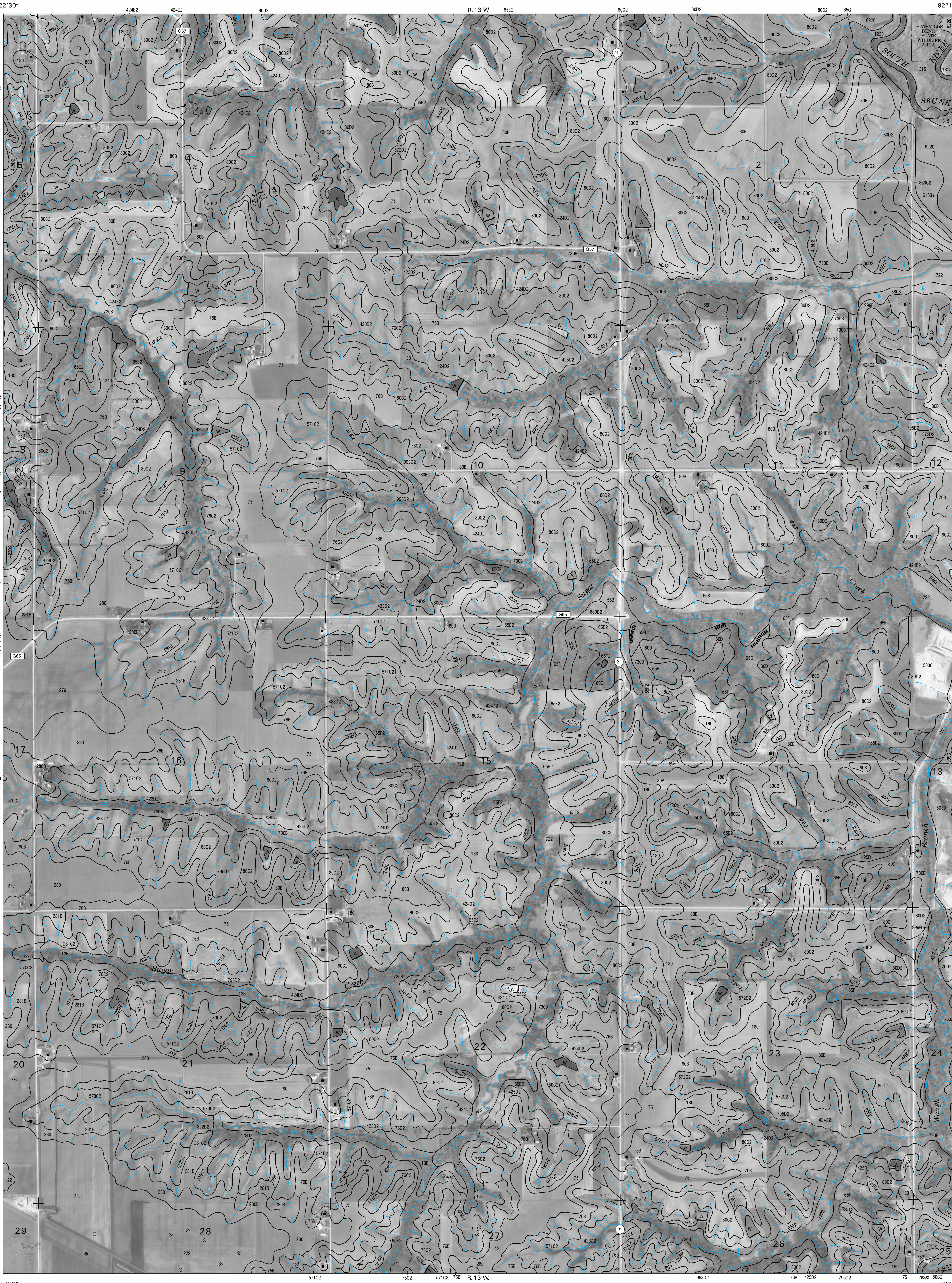
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

KEOKUK COUNTY, IOWA
HEDRICK NW QUADRANGLE
SHEET NUMBER 42 OF 56

(Joins sheet 34, Delta SW)

92° 22′30″ 41°15′00″

92°18′45″ 41°15′00″



(Joins sheet 41, Fremont NE)

(Joins sheet 43, Hedrick NE)

41°11′15″ 92° 22′30″

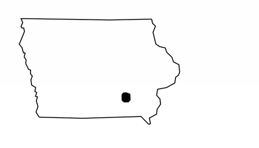
41°11′15″ 92°18′45″

(Joins sheet 50, Hedrick SW)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 15.
Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 ROSE HILL SE
2 DELTA SW
3 DELTA SE
4 FREMONT NE
5 HEDRICK NE
6 FREMONT SE
7 HEDRICK SW
8 HEDRICK SE

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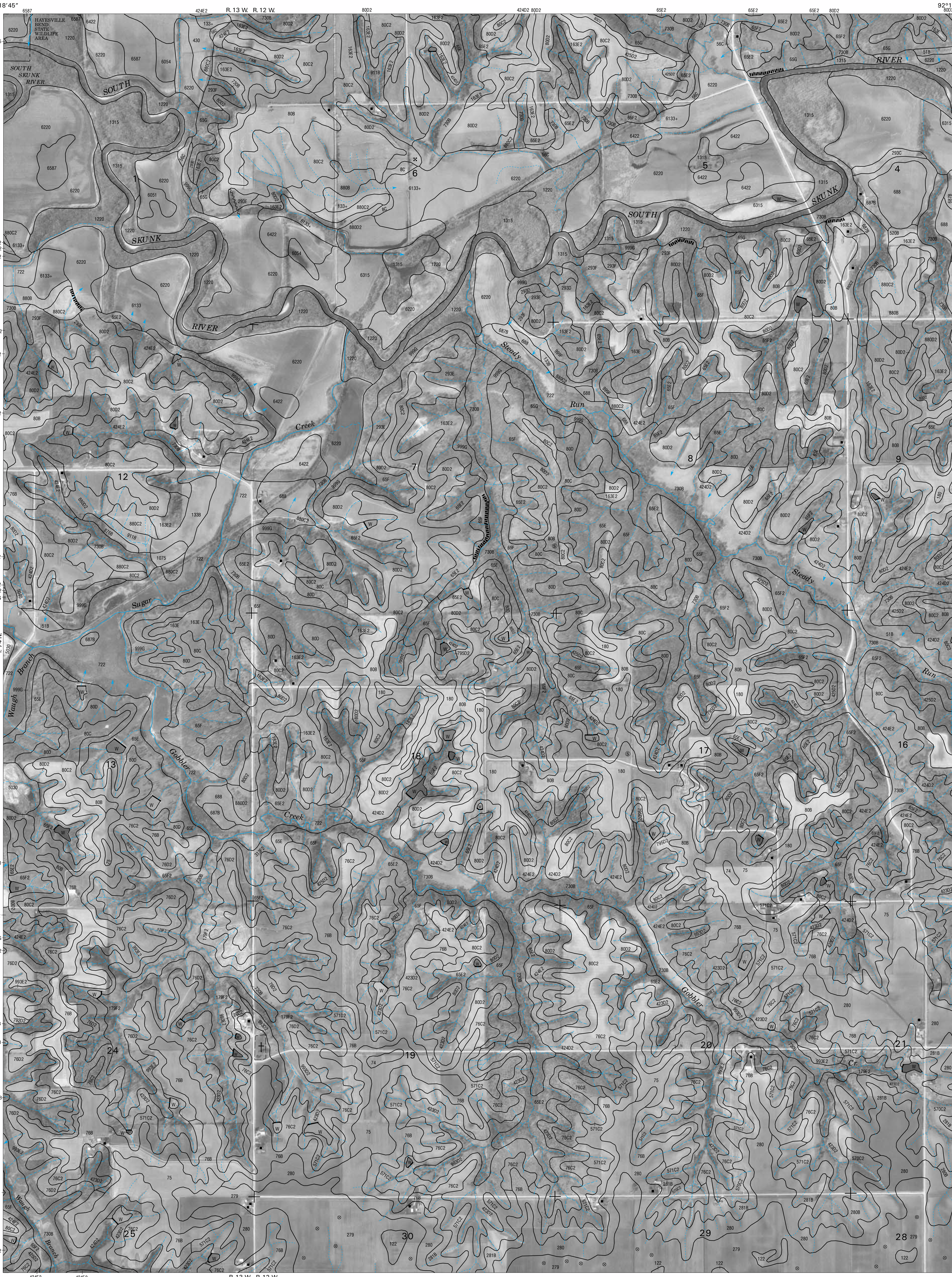
KEOKUK COUNTY, IOWA
HEDRICK NE QUADRANGLE
SHEET NUMBER 43 OF 56

(Joins sheet 35, Delta SE)

92°18′45″ 41°15′00″ — 92°15′00″ 41°15′00″



(Joins sheet 42, Hedrick NW)

(Joins sheet 44, Pekin NW)

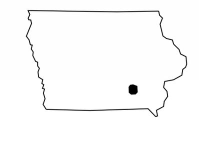
41°11′15″ 92°18′45″ — 41°11′15″ 92°15′00″

(Joins sheet 51, Hedrick SE)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 15.
Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5 MILES

500 0 500 1000 1500 2000 2500 3000 3500 FEET

0.5 0 0.5 KILOMETERS

1 DELTA SW
2 DELTA SE
3 SIGOURNEY SW
4 HEDRICK NW
5 PEKIN NW
6 HEDRICK SW
7 HEDRICK SE
8 PEKIN SW

INDEX TO ADJOINING 3.75 MAPS

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3.75 MINUTE SERIES
SHEET NUMBER 43 OF 56

UNITED STATES
DEPARTMENT OF AGRICULTURE
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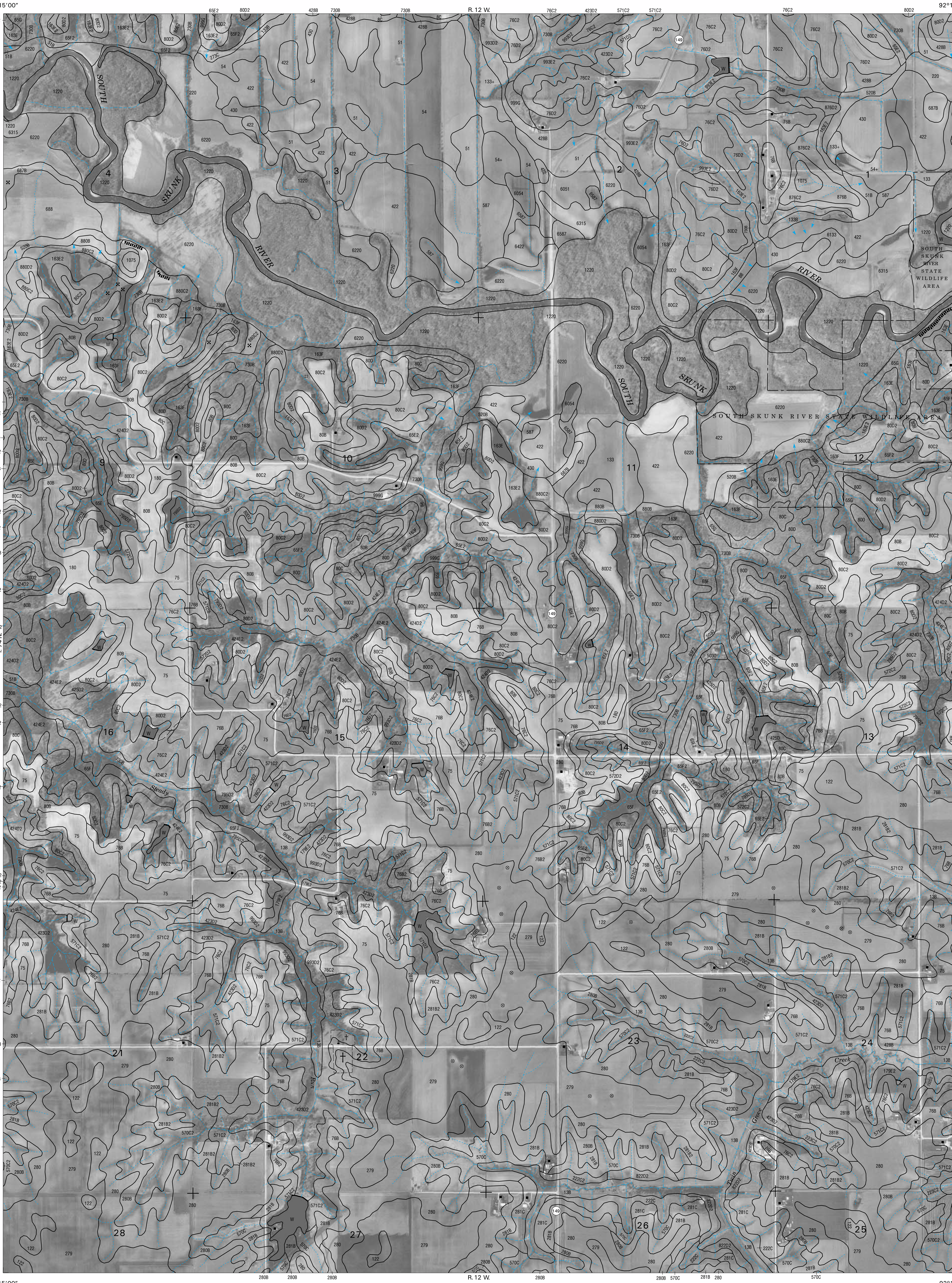
KEOKUK COUNTY, IOWA
PEKIN NW QUADRANGLE
SHEET NUMBER 44 OF 56

(Joins sheet 36, Sigourney SW)

92°15′00″ 41°15′00″ — 92°11′15″ 41°15′00″



41°11′15″ 92°15′00″ — 92°11′15″ 41°11′15″

(Joins sheet 52, Pekin SW)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 15.
Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

1 DELTA SE
2 SIGOURNEY SW
3 SIGOURNEY SE
4 HEDRICK NE
5 PEKIN NE
6 HEDRICK SE
7 PEKIN SW
8 PEKIN SE

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3.75 MINUTE SERIES
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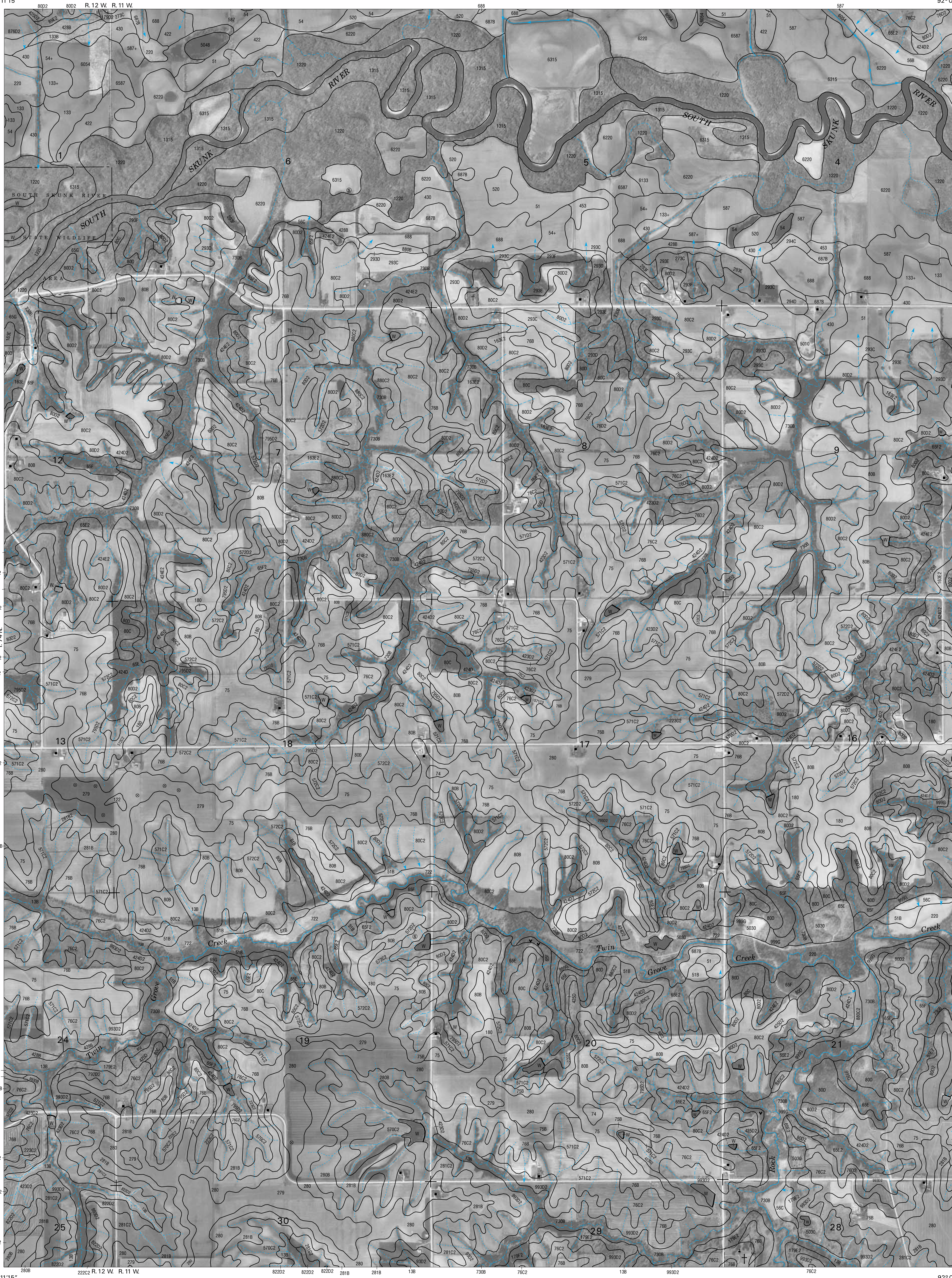
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

KEOKUK COUNTY, IOWA
PEKIN NE QUADRANGLE
SHEET NUMBER 45 OF 56

(Joins sheet 37, Sigourney SE)



(Joins sheet 53, Pekin SE)

SCALE 1:12000

MILES: 0.5 0 0.5

FEET: 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS: 0.5 0 0.5

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 15.
Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH

QUARTER QUADRANGLE LOCATION

1	2	3
4		5
6	7	8

1 SIGOURNEY SW
2 SIGOURNEY SE
3 HARPER SW
4 PEKIN NW
5 OLLIE NW
6 PEKIN SW
7 PEKIN SE
8 OLLIE SW

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UNITED STATES
DEPARTMENT OF AGRICULTURE
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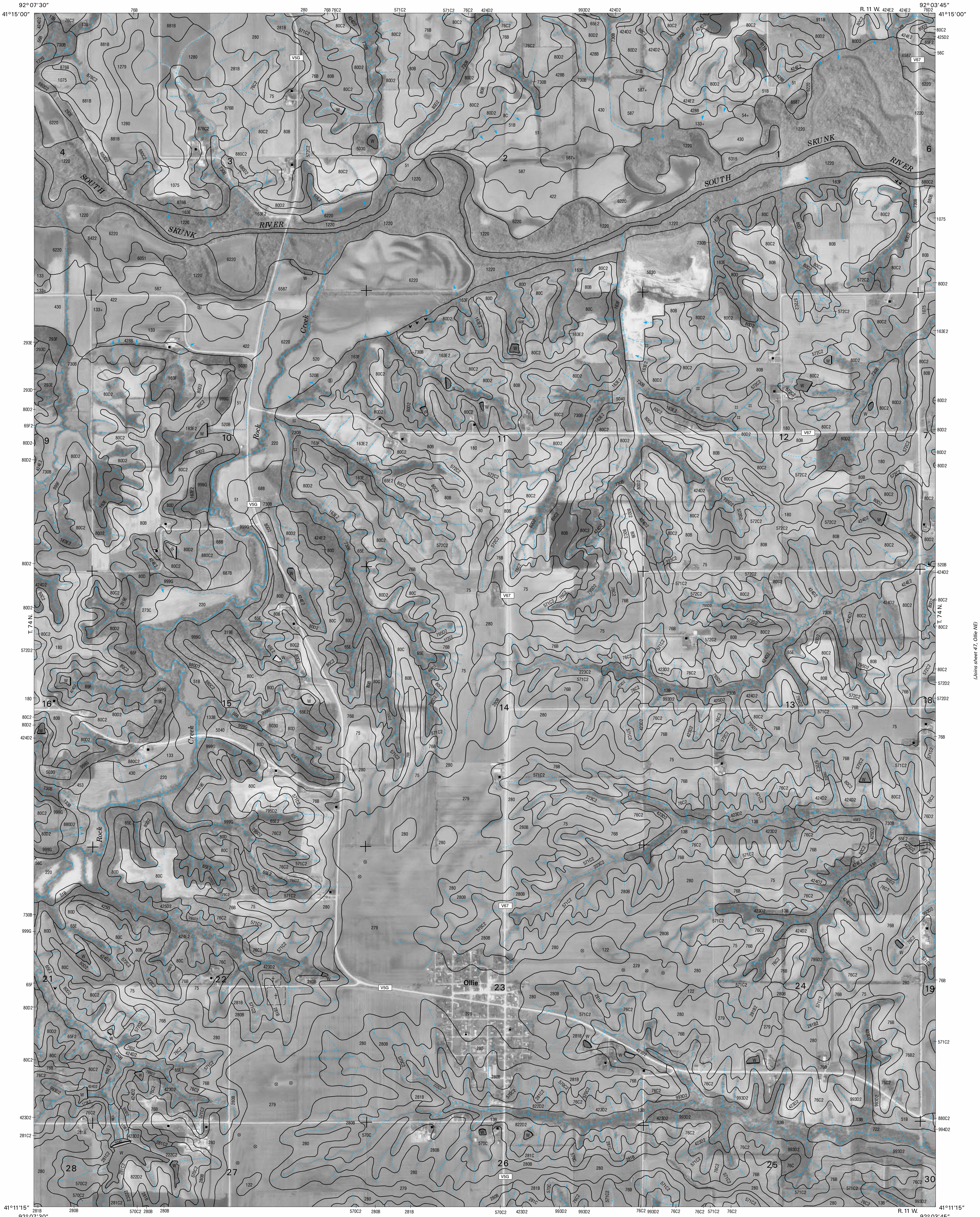
KEOKUK COUNTY, IOWA
OLLIE NW QUADRANGLE
SHEET NUMBER 46 OF 56



This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5 MILES

500 0 500 1000 1500 2000 2500 3000 3500 FEET

0.5 0 0.5 KILOMETERS

1	2	3
4		5
6	7	8

1 SIGOURNEY SE
2 HARPER SW
3 HARPER SE
4 PEKIN NE
5 OLLIE NE
6 PEKIN SE
7 OLLIE SW
8 OLLIE SE

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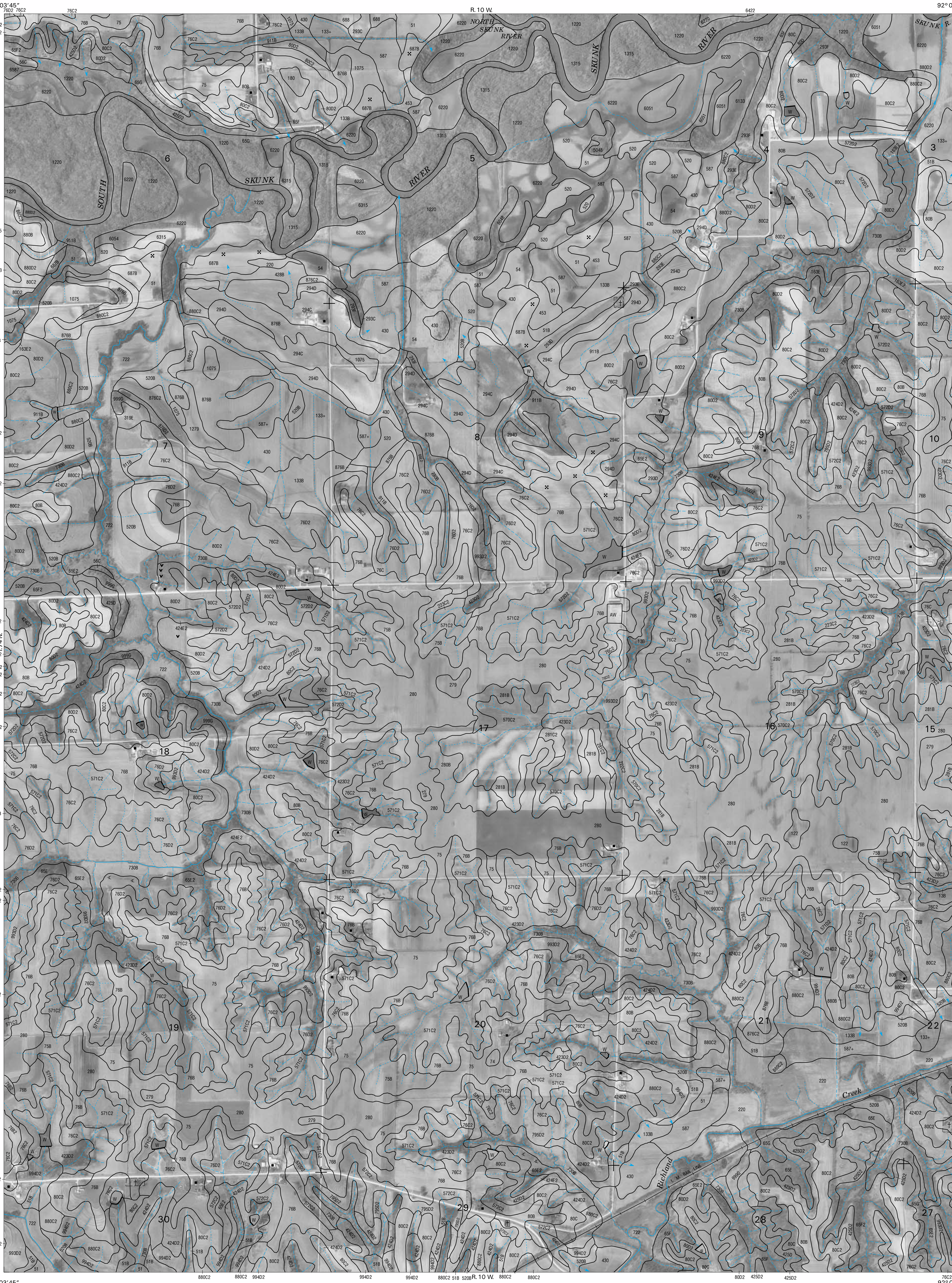
KEOKUK COUNTY, IOWA
OLLIE NE QUADRANGLE
SHEET NUMBER 47 OF 56

(Joins sheet 39, Harper SE)

92° 03′ 45″ 41°15′00″ — R. 10 W. — 92° 00′ 00″ 41°15′00″



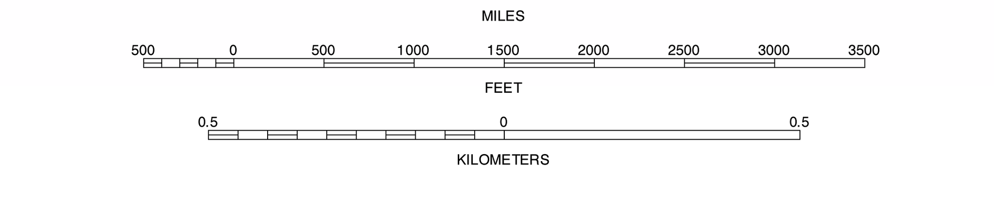
41°11′15″ 92° 03′ 45″ — R. 10 W. — 41°11′15″ 92° 00′ 00″

(Joins sheet 55, Ollie SE)

SCALE 1:12000

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.



1	2	3
4		5
6	7	8

1 HARPER SW
2 HARPER SE
3 KEOTA SW
4 OLLIE NW
5 RICHLAND NW
6 OLLIE SW
7 OLLIE SE
8 RICHLAND SW

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UNITED STATES
DEPARTMENT OF AGRICULTURE
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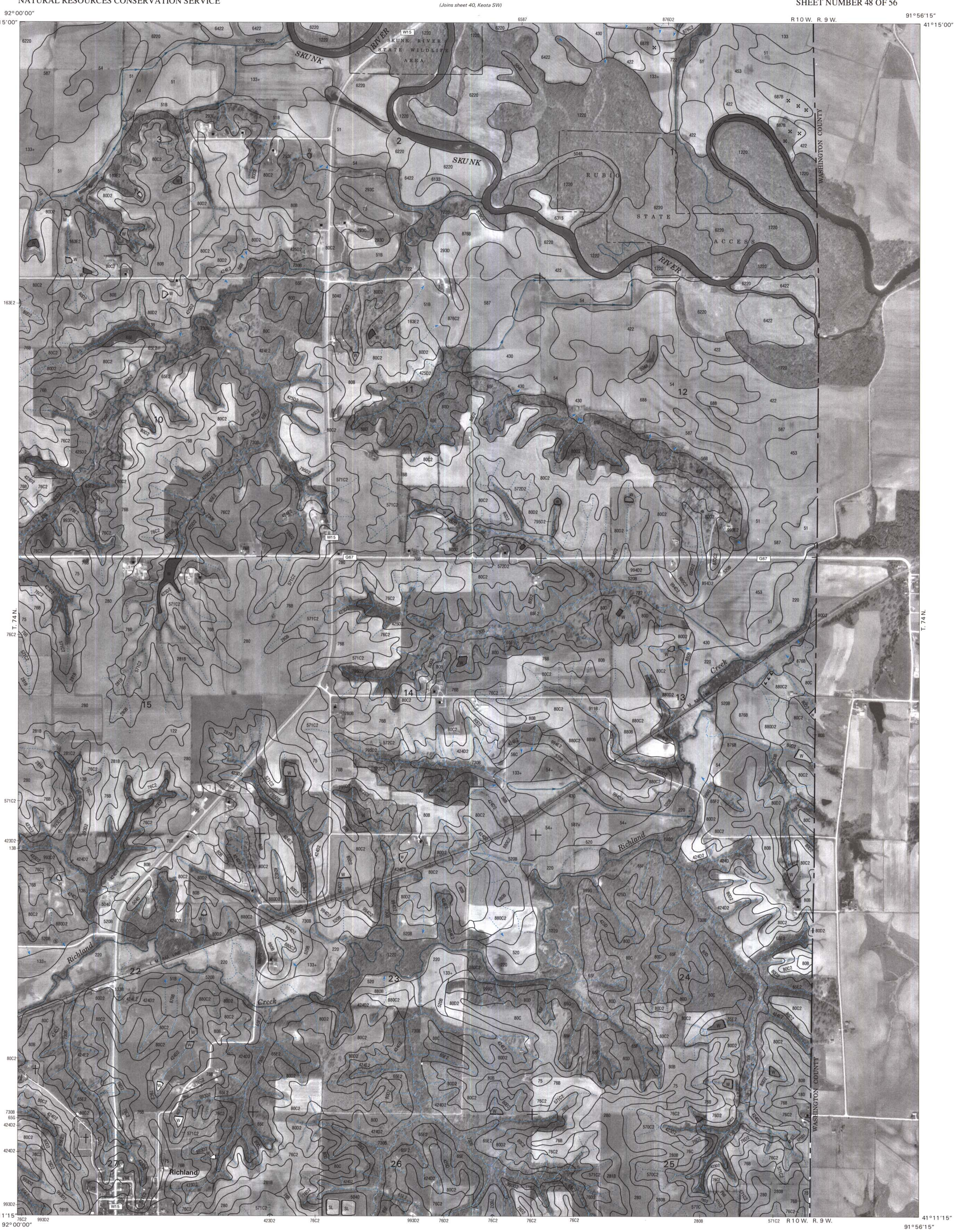
KEOKUK COUNTY, IOWA
RICHLAND NW QUADRANGLE
SHEET NUMBER 48 OF 56



This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 15.
Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 HARPER SE
2 KEOTA SW
3 KEOTA SE
4 OLLIE NE
5 RICHLAND NE
6 OLLIE SE
7 RICHLAND SW
8 RICHLAND SE

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DEPARTMENT OF AGRICULTURE
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KEOKUK COUNTY, IOWA
FREMONT SE QUADRANGLE
SHEET NUMBER 49 OF 56

(Joins sheet 41, Fremont NE)

92° 26′15″ 41° 11′15″

R. 14 W. R. 13 W.

92° 22′30″ 41° 11′15″

(Joins sheet 50, Hedrick SW)

41° 07′30″ 92° 26′15″

R. 14 W. R. 13 W.

41° 07′30″ 92° 22′30″

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5 MILES

500 0 500 1000 1500 2000 2500 3000 3500 FEET

0.5 0 0.5 KILOMETERS

1	2	3
4		5
6	7	8

1 FREMONT NW
2 FREMONT NE
3 HEDRICK NW
4 FREMONT SW
5 HEDRICK SW
6 OTTUMWA NORTH NW
7 OTTUMWA NORTH NE
8 FARSON NW

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DEPARTMENT OF AGRICULTURE
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KEOKUK COUNTY, IOWA
HEDRICK SW QUADRANGLE
SHEET NUMBER 50 OF 56

(Joins sheet 42, Hedrick NW)

92° 22′30″ 41°11′15″ — 92°18′45″ 41°11′15″

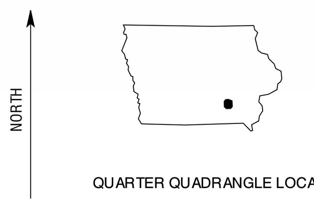
(Joins sheet 49, Fremont SE)

(Joins sheet 51, Hedrick SE)

41° 07′30″ 92° 22′30″ — R. 13 W. — 41° 07′30″ 92°18′45″

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 15.
Coordinate grid ticks and land division data, if shown, are approximately positioned.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 FREMONT NE
2 HEDRICK NW
3 HEDRICK NE
4 FREMONT SE
5 HEDRICK SE
6 OTTUMWA NORTH NE
7 FARSON NW
8 FARSON NE

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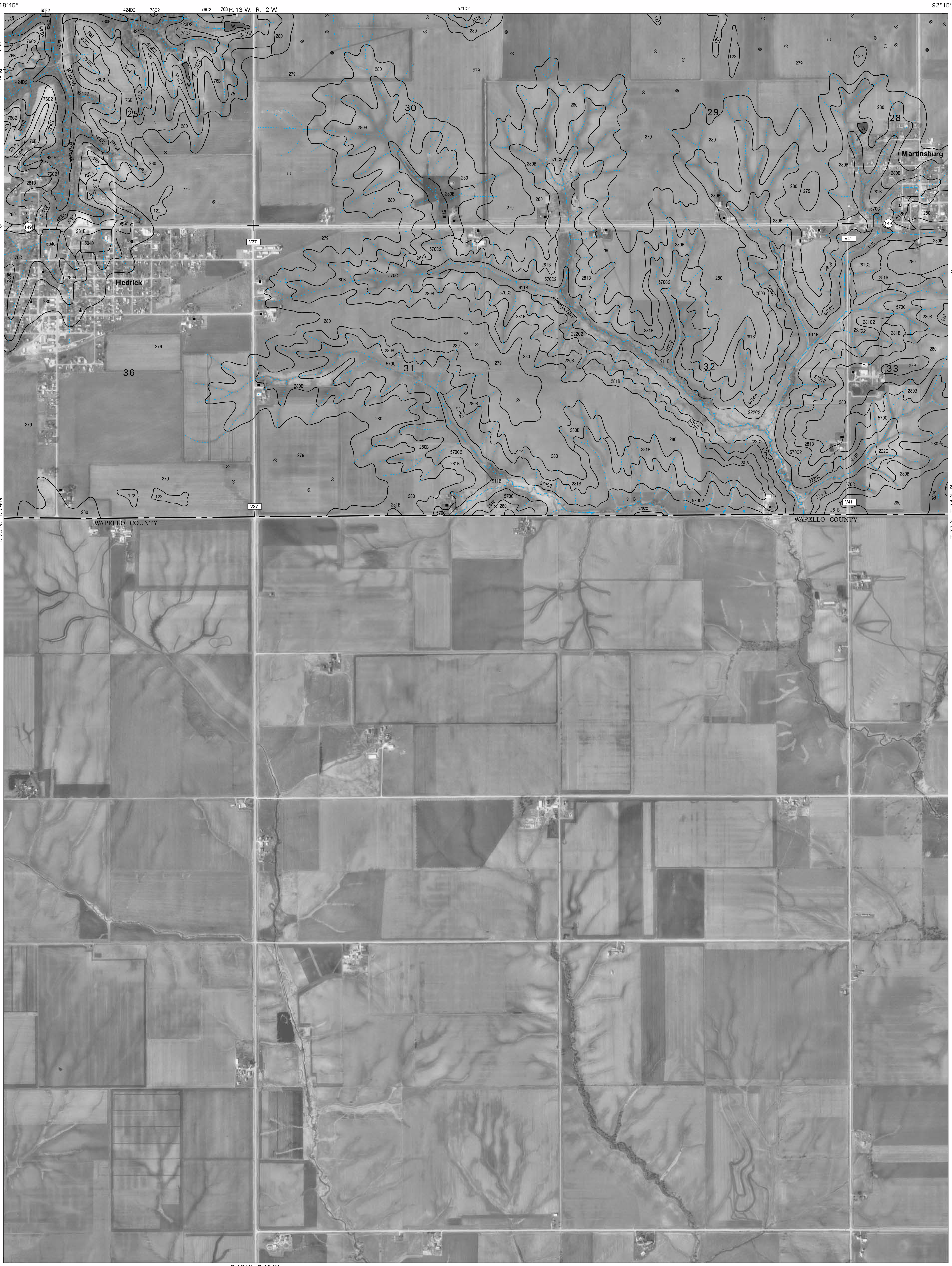
KEOKUK COUNTY, IOWA
HEDRICK SE QUADRANGLE
SHEET NUMBER 51 OF 56

(Joins sheet 43, Hedrick NE)

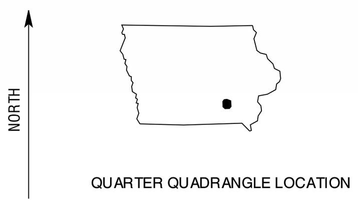


(Joins sheet 50, Hedrick SW)

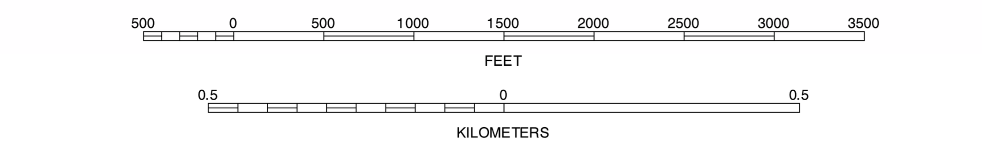
(Joins sheet 52, Pekin SW)

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 15.
Coordinate grid ticks and land division data, if shown, are approximately positioned.



SCALE 1:12000



1	2	3
4		5
6	7	8

1 HEDRICK NW
2 HEDRICK NE
3 PEKIN NW
4 HEDRICK SW
5 PEKIN SW
6 FARSON NW
7 FARSON NE
8 ABINGDON NW

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UNITED STATES
DEPARTMENT OF AGRICULTURE
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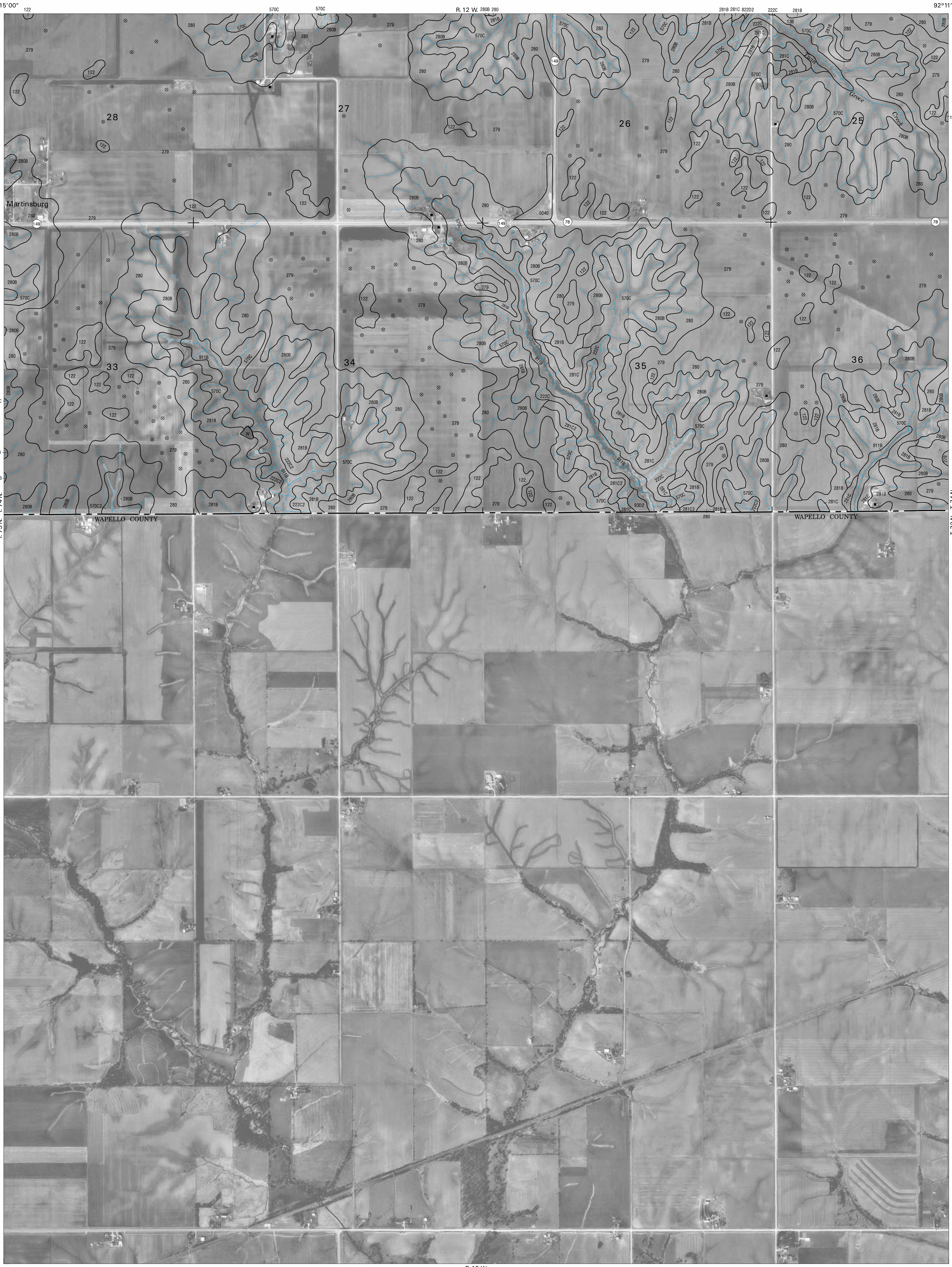
KEOKUK COUNTY, IOWA
PEKIN SW QUADRANGLE
SHEET NUMBER 52 OF 56



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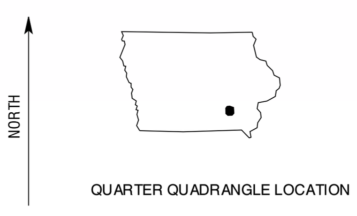
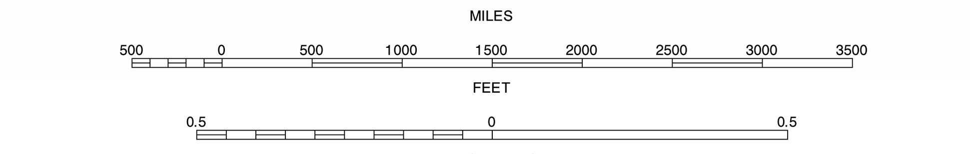
North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000



1	2	3	1 HEDRICK NE 2 PEKIN NW 3 PEKIN NE
4		5	4 HEDRICK SE 5 PEKIN SE
6	7	8	6 FARSON NE 7 ABINGDON NW 8 ABINGDON NE

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UNITED STATES
DEPARTMENT OF AGRICULTURE
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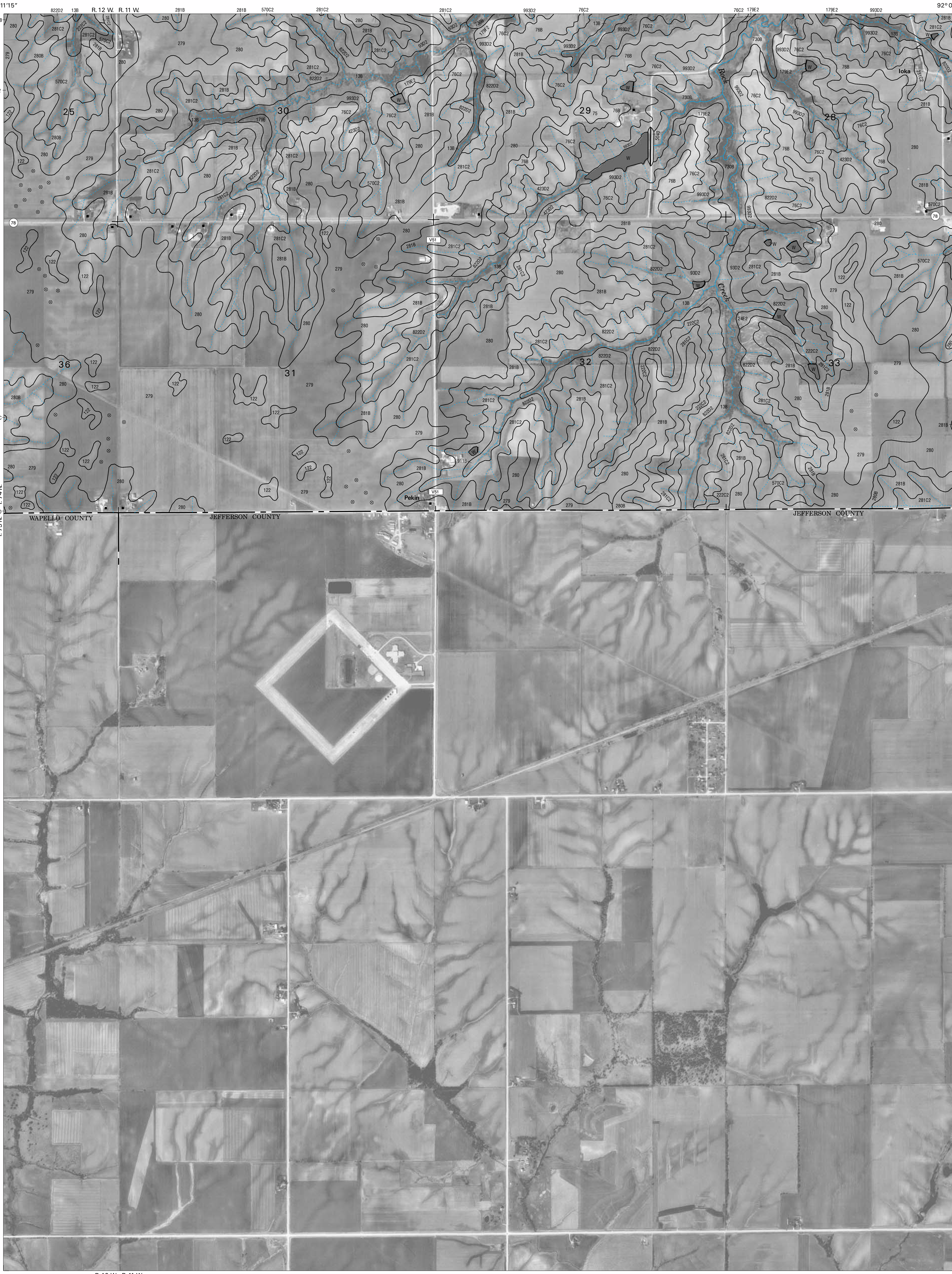
KEOKUK COUNTY, IOWA
PEKIN SE QUADRANGLE
SHEET NUMBER 53 OF 56

(Joins sheet 45, Pekin NE)



(Joins sheet 52, Pekin SW)

(Joins sheet 54, Ollie SW)

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North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	3
4		5
6	7	8

1 PEKIN NW
2 PEKIN NE
3 OLLIE NW
4 PEKIN SW
5 OLLIE SW
6 ABINGDON NW
7 ABINGDON NE
8 BROOKVILLE NW

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UNITED STATES
DEPARTMENT OF AGRICULTURE
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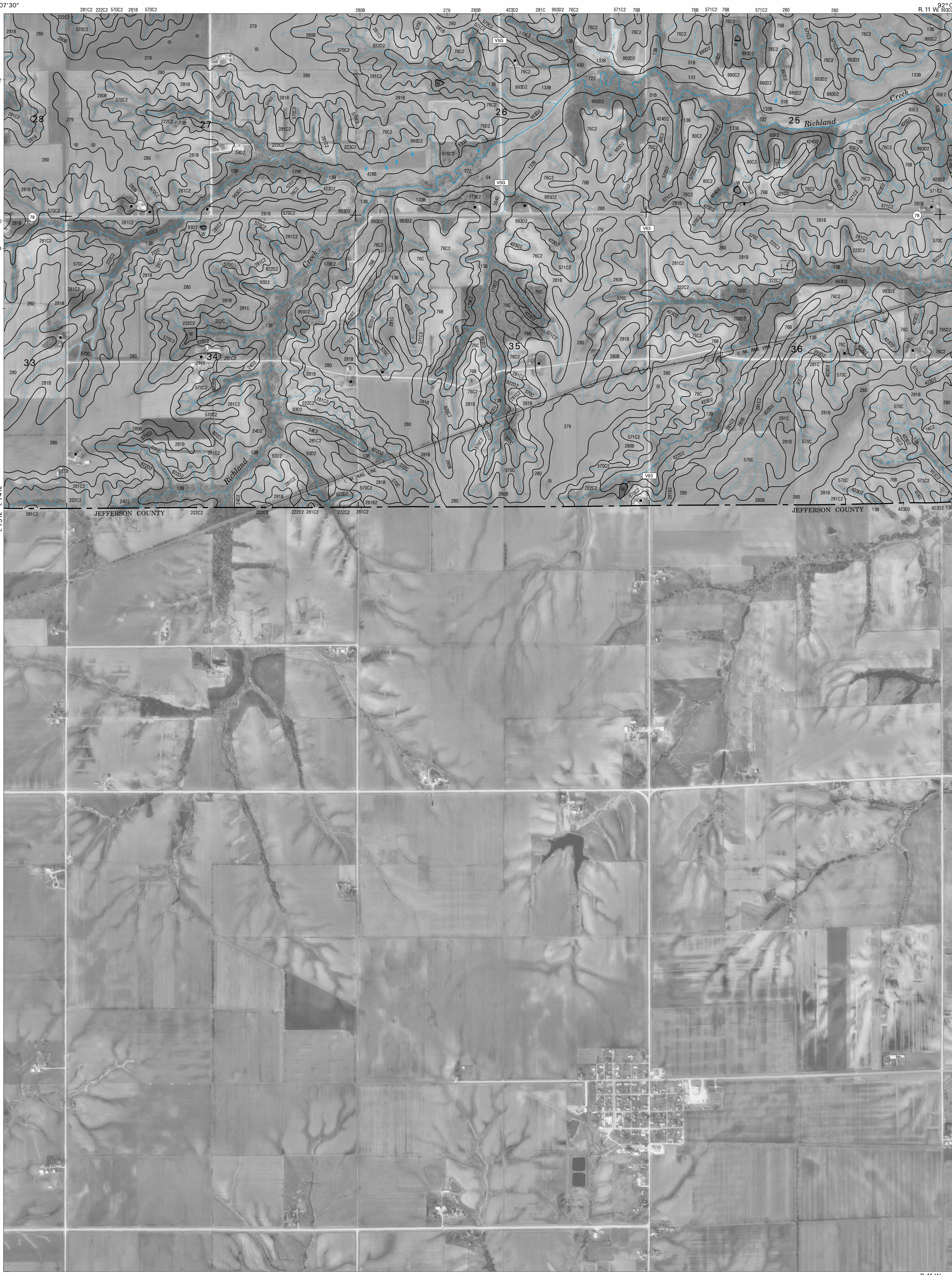
KEOKUK COUNTY, IOWA
OLLIE SW QUADRANGLE
SHEET NUMBER 54 OF 56

(Joins sheet 46, Ollie NW)

92° 07′30″ 41°11′15″ — 92° 03′45″ 41°11′15″ R. 11 W.



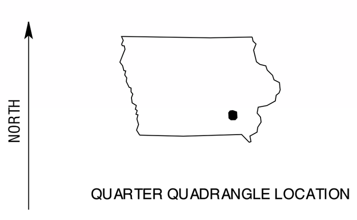
(Joins sheet 53, Pekin SE)

(Joins sheet 55, Ollie SE)

41° 07′30″ 92° 07′30″ — R. 11 W. 41° 07′30″ 92° 03′45″

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5 MILES

500 0 500 1000 1500 2000 2500 3000 3500 FEET

0.5 0 0.5 KILOMETERS

1	2	3
4		5
6	7	8

1 PEKIN NE
2 OLLIE NW
3 OLLIE NE
4 PEKIN SE
5 OLLIE SE
6 ABINGDON NE
7 BROOKVILLE NW
8 BROOKVILLE NE

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3.75 MINUTE SERIES
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DEPARTMENT OF AGRICULTURE
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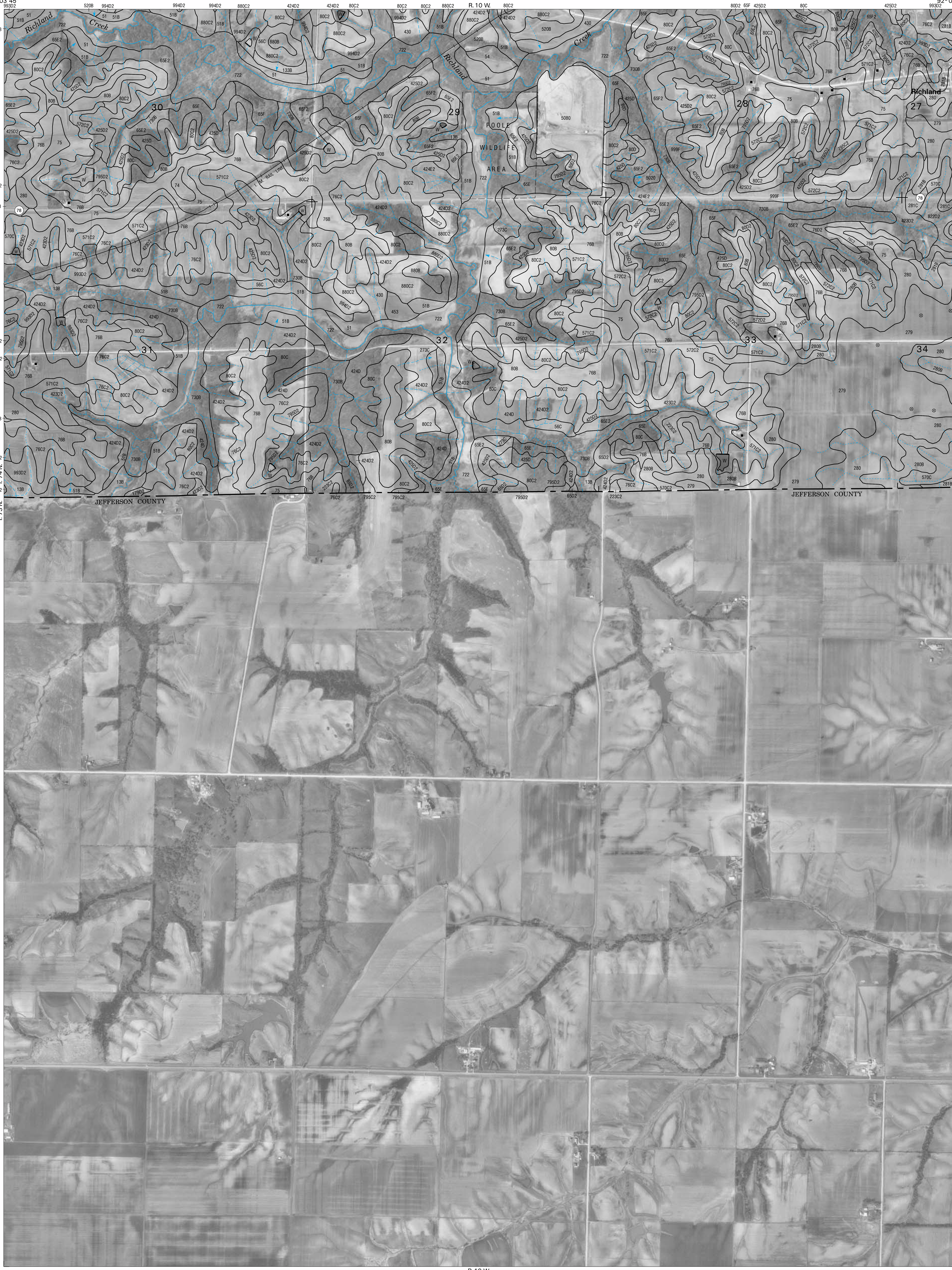
KEOKUK COUNTY, IOWA
OLLIE SE QUADRANGLE
SHEET NUMBER 55 OF 56

(Joins sheet 47, Ollie NE)

92° 03′ 45″ 41° 11′ 15″ — 92° 00′ 00″ 41° 11′ 15″



(Joins sheet 54, Ollie SW)

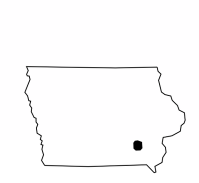
(Joins sheet 56, Richland SW)

41° 07′ 30″ 92° 03′ 45″ — R. 10 W. — 41° 07′ 30″ 92° 00′ 00″

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.

NORTH



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES: 0.5 0 0.5

FEET: 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS: 0.5 0 0.5

1	2	3
4		5
6	7	8

1 OLLIE NW
2 OLLIE NE
3 RICHLAND NW
4 OLLIE SW
5 RICHLAND SW
6 BROOKVILLE NW
7 BROOKVILLE NE
8 FAIRFIELD NORTH NW

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DEPARTMENT OF AGRICULTURE
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KEOKUK COUNTY, IOWA
RICHLAND SW QUADRANGLE
SHEET NUMBER 56 OF 56

(Joins sheet 48, Richland NW)

92° 00′00″ 41° 11′15″

91° 56′15″ 41° 11′15″

41° 07′30″ 92° 00′00″

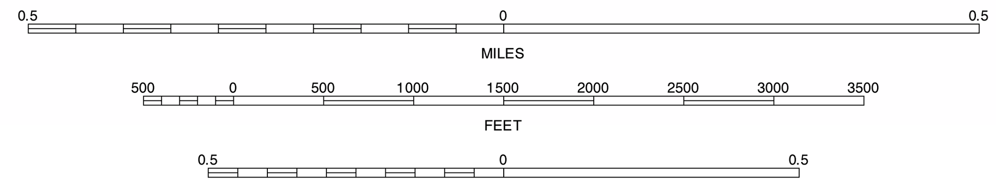
R. 10 W. R. 9 W.

41° 07′30″ 91° 56′15″

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1990 aerial photography. Public land survey system (PLSS) information and culture annotation were acquired from the U.S. Geological Survey. The hydrography layer was developed jointly in the soil mapping effort by field soil scientists. The cultural content and hydrography layer were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned.

SCALE 1:12000



1	2	3
4		5
6	7	8

1 OLLIE NE
2 RICHLAND NW
3 RICHLAND NE
4 OLLIE SE
5 RICHLAND SE
6 BROOKVILLE NE
7 FAIRFIELD NORTH NW
8 FAIRFIELD NORTH NE

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